NASA SP-7039 (40)
January 1992

NASA PATENT ABSTRACTS BIBLIOGRAPHY

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A CONTINUING BIBLIOGRAPHY
SECTION 1 ABSTRACTS

(NASA-SP-7039(40)-Sect-1) NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY. SECTION 1: ABSTRACTS (SUPPLEMENT 40) (NASA) 81 p CSCL 05B
N92-22508
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NASA STI PROGRAM
SCIENTIFIC & TECHNICAL INFORMATION

ACCESSION NUMBER RANGES

Bibliography Number	*STAR Accession Numbers*
NASA SP-7039(04) SEC 1	N69-20701 - N73-33931
NASA SP-7039(12) SEC 1	N74-10001 - N77-34042
NASA SP-7039(13) SEC 1	N78-10001 - N78-22018
NASA SP-7039(14) SEC 1	N78-22019 - N78-34034
NASA SP-7039(15) SEC 1	N79-10001 - N79-21993
NASA SP-7039(16) SEC 1	N79-21994 - N79-34158
NASA SP-7039(17) SEC 1	N80-10001 - N80-22254
NASA SP-7039(18) SEC 1	N80-22255 - N80-34339
NASA SP-7039(19) SEC 1	N81-10001 - N81-21997
NASA SP-7039(20) SEC 1	N81-21998 - N81-34139
NASA SP-7039(21) SEC 1	N82-10001 - N82-22140
NASA SP-7039(22) SEC 1	N82-22141 - N82-34341
NASA SP-7039(23) SEC 1	N83-10001 - N83-23266
NASA SP-7039(24) SEC 1	N83-23267 - N83-37053
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NASA SP-7039(26) SEC 1	N84-22527 - N84-35284
NASA SP-7039(27) SEC 1	N85-10001 - N85-22341
NASA SP-7039(28) SEC 1	N85-22342 - N85-36162
NASA SP-7039(29) SEC 1	N86-10001 - N86-22536
NASA SP-7039(30) SEC 1	N86-22537 - N86-33262
NASA SP-7039(31) SEC 1	N87-10001 - N87-20170
NASA SP-7039(32) SEC 1	N87-20171 - N87-30248
NASA SP-7039(33) SEC 1	N88-10001 - N88-20253
NASA SP-7039(34) SEC 1	N88-20254 - N88-30583
NASA SP-7039(35) SEC 1	N89-10001 - N89-20085
NASA SP-7039(36) SEC 1	N89-20086 - N89-30155
NASA SP-7039(37) SEC 1	N90-10001 - N90-20043
NASA SP-7039(38) SEC 1	N90-20044 - N90-30170
NASA SP-7039(39) SEC 1	N91-10001 - N91-21058
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This bibliography was prepared by the NASA Center for AeroSpace Information operated for the National Aeronautics and Space Administration.

NASA SP-7039 (40)
January 1992

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY
SECTION 1 ABSTRACTS

National Aeronautics and Space Administration
Scientific and Technical Information Program
Washington, DC 1992

This supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22161, price code A05.

INTRODUCTION

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography (NASA PAB)* is a semiannual NASA publication containing comprehensive abstracts and indexes of NASA-owned inventions covered by U.S. patents and applications for patent. The citations included in *NASA PAB* were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

For the convenience of the user, each issue of *NASA PAB* has a separately bound Abstract Section (Section 1) and Index Section (Section 2). Although each Abstract Section covers only the indicated six-month period, the Index Section is cumulative covering all NASA-owned inventions announced in *STAR* since 1969. Thus a complete set of *NASA PAB* would consist of the Abstract Sections of Issue 04 (January 1974) and Issue 12 (January 1978) and the Abstract Section for all subsequent issues and the Index Section for the most recent issue.

The 181 citations published in this issue of the Abstract Section cover the period July 1991 through December 1991. The Index Section references over 5100 citations covering the period May 1969 through December 1991.

ABSTRACT SECTION (SECTION 1)

This *PAB* issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in *PAB* supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry in the Abstract Section consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in order of the ascending NASA Accession Number originally assigned for *STAR* to the invention. The range of NASA Accession Numbers within each issue is printed on the inside front cover.

Abstract Citation Data Elements: Each of the abstract citations has several data elements useful for identification and indexing purposes, as follows:

NASA Accession Number
NASA Case Number
Inventor's Name
Title of Invention
U.S. Patent Application Serial Number
U.S. Patent Number (for issued patents only)
U.S. Patent Office Classification Number(s)
(for issued patents only)

These data elements are identified in the Typical Citation and Abstract and in the indexes.

INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes. These indexes are cross-indexed and are used to locate a single invention or groups of inventions.

Subject Index: Lists all inventions according to appropriate alphabetized technical term and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Inventor Index: Lists all inventions according to alphabetized names of inventors and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Source Index: Lists all inventions according to alphabetized source of invention (i.e., name of contractor or government installation where invention was made) and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Number Index: Lists inventions in order of ascending (1) NASA Case Number, (2) U.S. Patent Application Serial Number, (3) U.S. Patent Classification Number, and (4) U.S. Patent Number and indicates the related Subject Category Number and the Accession Number.

Accession Number Index: Lists all inventions in order of ascending Accession Number and indicates the related Subject Category Number, the NASA Case Number, the U.S. Patent Application Serial Number, the U.S. Patent Classification Number, and the U.S. Patent Number.

HOW TO USE THIS PUBLICATION TO IDENTIFY NASA INVENTIONS

To identify one or more NASA inventions within a specific technical field or subject, several techniques are possible with the flexibility incorporated into the *NASA PAB*.

(1) *Using Subject Category:* To identify all NASA inventions in any one of the subject categories in this issue of *NASA PAB*, select the desired Subject Category in the Abstract Section (Section 1) and find the inventions abstracted thereunder.

(2) *Using Subject Index:* To identify all NASA inventions listed under a desired technical subject index term, (A) turn to the cumulative Subject Index in the Index Section and find the invention(s) listed under the desired technical subject term. (B) Note the indicated Accession Number and the Subject Category Number. (C) Using the indicated Accession Number, turn to the inside front cover of the Index Section to determine which issue of the Abstract Section includes the Accession Number desired. (D) To find the abstract of the particular invention in the issue of the Abstract Section selected, (1) use the Subject Category Number to locate the Subject Category and (2) use the Accession Number to locate the desired invention within the Subject Category listing.

(3) *Using Patent Classification Index:* To identify all inventions covered by issued NASA patents (not including applications for patent) within a desired Patent Classification, (A) turn to the Patent Classification Number in the Number Index of Section 2 and find the associated invention(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

TYPICAL CITATION AND ABSTRACT

NASA SPONSORED

ACCESSION NUMBER → **N91-32795*** National Aeronautics and Space Administration. ← CORPORATE SOURCE
Marshall Space Flight Center, Huntsville, AL.

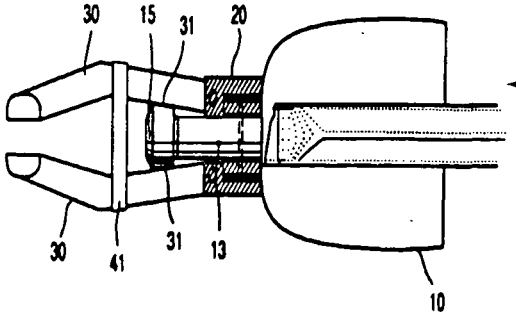
TITLE → **ROTATIONALLY ACTUATED PROSTHETIC HELPING HAND Patent**

INVENTORS → WILLIAM E. NORTON, inventor (to NASA), JEWELL G. BELCHER, JR., inventor (to NASA), JAMES R. CARDEN, inventor (to NASA), and THOMAS W. WEST, inventor (to NASA) 4 Jun. 1991 10 p Filed 12 Apr. 1990 Supersedes N90-27261 (28 - 21, p 3036)

NASA CASE NUMBER → (NASA-CASE-MFS-28426-1; US-PATENT-5,021,065;
US PATENT APPLICATIONS SERIAL NUMBERS → US-PATENT-APPL-SN-508154; US-PATENT-CLASS-623-63; US-PATENT-CLASS-623-62; INT-PATENT-CLASS-A61F-2/58; INT-PATENT-CLASS-A61F-2/68) Avail: US Patent and ← AVAILABILITY SOURCE
Trademark Office CSCL 06K ← COSATI CODE

A prosthetic device has been developed for below-the-elbow amputees. The device consists of a cuff, a stem, a housing, two hook-like fingers, an elastic band for holding the fingers together, and a brace. The fingers are pivotally mounted on a housing that is secured to the amputee's upper arm with the brace. The stem, which also contains a cam, is rotationally mounted within the housing and is secured to the cuff, which fits over the amputee's stump. By rotating the cammed stem between the fingers with the lower arm, the amputee can open and close the fingers. ← ABSTRACT

Official Gazette of the U.S. Patent and Trademark Office



← KEY ILLUSTRATION

TABLE OF CONTENTS

Section 1 • Abstracts

N.A.—no abstracts were assigned to this category for this issue.

CHEMISTRY AND MATERIALS

ENGINEERING For related information see also *Physics.*

GEOSCIENCES For related information see also *Space Sciences.*

LIFE SCIENCES

MATHEMATICAL AND COMPUTER SCIENCES

PHYSICS For related information see also *Engineering.*

SOCIAL SCIENCES

SPACE SCIENCES For related information see also *Geosciences.*

GENERAL

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.

Section 2 • Indexes

JANUARY 1992 (Supplement 40)

NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

02
AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

N91-27139* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SELECTABLE TOWLINE SPIN CHUTE SYSTEM Patent
DANIEL M. VAIRO, inventor (to NASA) and RAYMOND D. WHIPPLE, inventor (to NASA) 4 Jun. 1991 22 p Filed 25 Oct. 1990
(NASA-CASE-LAR-14322-1; US-PATENT-5,020,739; US-PATENT-APPL-SN-603335; US-PATENT-CLASS-244-75R; US-PATENT-CLASS-244-113; US-PATENT-CLASS-244-139; INT-PATENT-CLASS-B64C-17/00) Avail: US Patent and Trademark Office CSCL 01A

An emergency spin recovery parachute is presented that is housed within a centrally mounted housing on the aft end of an aircraft and connected to a ring fitting within the housing. Two selectively latching shackles connected to separate towlines are openly disposed adjacent the ring fitting. The towlines extend in opposite directions from the housing along the aircraft wing to attachment points adjacent the wing-tips where the other end of each towline is secured. Upon pilot command, one of the open shackles latches to the ring fitting to attach the towline connected thereto, and a second command signal deploys the parachute. Suitable break-away straps secure the towlines to the aircraft surface until the parachute is deployed and the resulting force on the towline attached to the parachute overcomes the straps and permits the towline to extend to the point of attachment to exert sufficient drag on the spinning aircraft to permit the pilot to regain control of the aircraft. To employ the parachute as a drag chute to reduce landing speeds, both shackles and their respective towlines are latched to the ring fitting.

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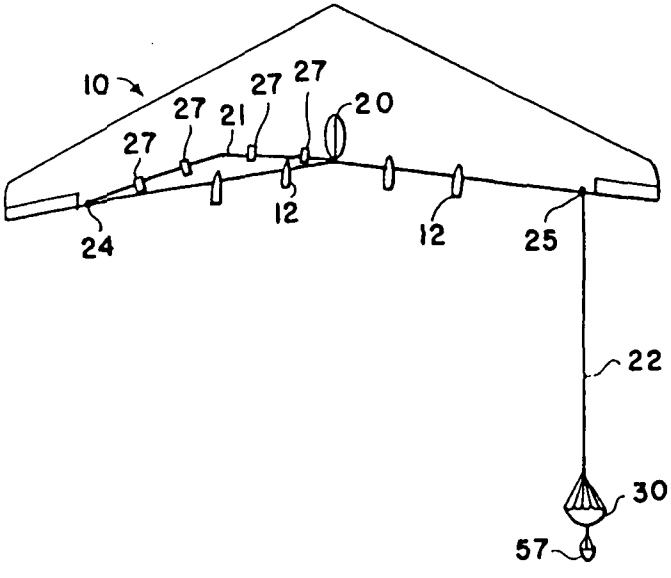
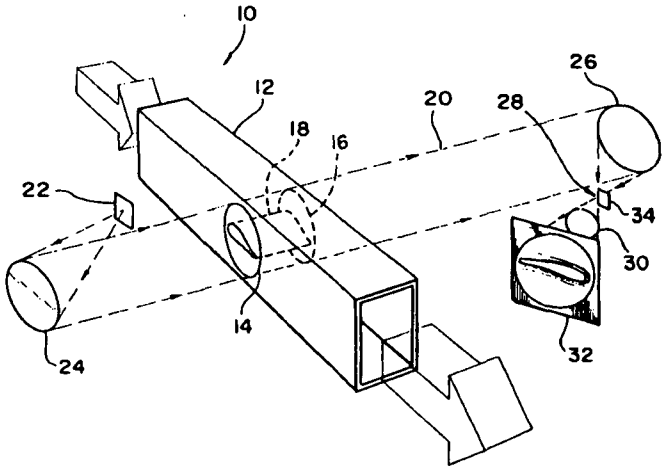


N91-28135*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
VAPORIZING PARTICLE VELOCIMETER Patent Application
LEONARD M. WEINSTEIN, inventor (to NASA) 14 Jun. 1991 14 p
(NASA-CASE-LAR-14685-1; NAS 1.71:LAR-14685-1; US-PATENT-APPL-SN-718313) Avail: NTIS HC/MF A03 CSCL 01A

A velocimeter measures flow characteristics of a flow traveling through a chamber in a given direction. Tracer particles are entrained in the flow and a source of radiant energy produces an output stream directed transverse to the chamber and having a sufficient intensity to vaporize the particles as they pass through the output stream. Each of the vaporized particles explodes to produce a shock wave and a hot core, and a flow visualization system tracks the motion of the hot cores and shock waves to thereby measure velocity of each tracer particle, and temperature of the flow around the tracer.

NASA



03
AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

N91-31113* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
AIRBORNE RESCUE SYSTEM Patent
LEONARD A. HASLIM, inventor (to NASA) 4 Jun. 1991 12 p Filed 6 Oct. 1989 Supersedes N91-23095 (29 - 15, p 2367)
(NASA-CASE-ARC-11909-1; US-PATENT-5,020,742; US-PATENT-APPL-SN-418320; US-PATENT-CLASS-244-137.2; US-PATENT-CLASS-441-83; INT-PATENT-CLASS-B64D-1/08; INT-PATENT-CLASS-B64D-9/00; INT-PATENT-CLASS-B64C-1/22; INT-PATENT-CLASS-B63C-9/01) Avail: US Patent and Trademark Office CSCL 01C

The airborne rescue system includes a boom with telescoping members for extending a line and collar to a rescue

victim. The boom extends beyond the tip of the helicopter rotor so that the victim may avoid the rotor downwash. The rescue line is played out and reeled in by winch. The line is temporarily retained under the boom. When the boom is extended, the rescue line passes through clips. When the victim dons the collar and the tension in the line reaches a predetermined level, the clips open and release the line from the boom. Then the rescue line can form a straight line between the victim and the winch, and the victim can be lifted to the helicopter. A translator is utilized to push out or pull in the telescoping members. The translator comprises a tape and a rope. Inside the telescoping members the tape is curled around the rope and the tape has a tubelike configuration. The tape and rope are provided from supply spools.

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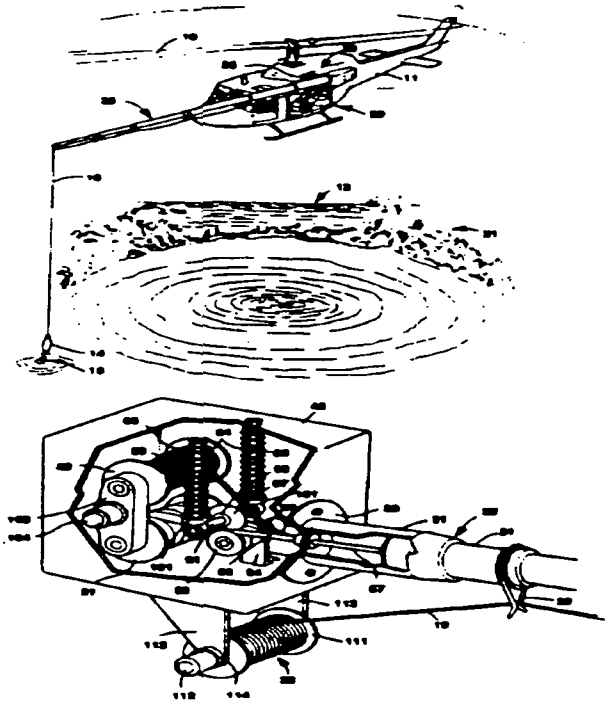

04

AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

N91-31120* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
AIRPLANE TAKEOFF AND LANDING PERFORMANCE MONITORING SYSTEM Patent
DAVID B. MIDDLETON, inventor (to NASA), RAGHAVACHARI SRIVATSAN, inventor (to NASA), and LEE H. PERSON, JR., inventor (to NASA) 10 Sep. 1991 28 p Filed 6 Aug. 1987 Supersedes N88-24621 (26 - 18, p 2462) Continuation-in-part of US-Patent-Appl-SN-082766
(NASA-CASE-LAR-13854-1-CU; US-PATENT-5,047,9421-CU; US-PATENT-APPL-SN-192562; US-PATENT-APPL-SN-082766; US-PATENT-CLASS-364-427; US-PATENT-CLASS-364-428; US-PATENT-CLASS-73-178T; INT-PATENT-CLASS-G06F-15/50)
Avail: US Patent and Trademark Office CSCL 17G

The invention is a real-time takeoff and landing performance monitoring system for an aircraft which provides a pilot with graphic and metric information to assist in decisions related to achieving rotation speed within the safe zone of a runway, or stopping the aircraft on the runway after landing or takeoff abort. By comparing the present performance of the aircraft with a predicted nominal performance based upon given conditions, performance deficiencies are detected by the system. The system provides a head-down display and a head-up display. The head-up display is projected onto a partially reflective transparent surface through which the pilot views the runway. Hence, the system supplies the pilot with critical status information while allowing the pilot to continue to view the runway.

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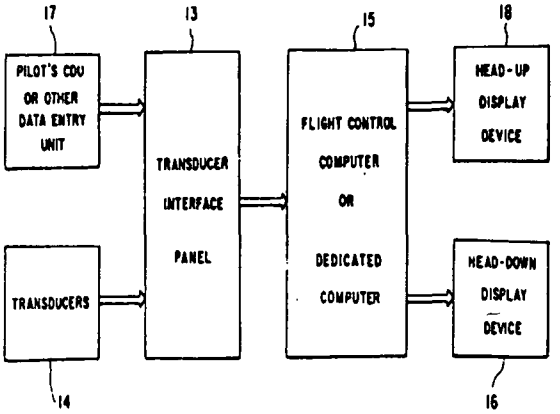

05

AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

N91-27156* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PASSIVE VENTING TECHNIQUE FOR SHALLOW CAVITIES Patent
ROBERT L. STALLINGS, JR., inventor (to NASA) and FLOYD J. WILCOX, JR., inventor (to NASA) 28 May 1991 11 p Filed 28 Sep. 1988
(NASA-CASE-LAR-13875-1; US-PATENT-5,018,688; US-PATENT-APPL-SN-250468; US-PATENT-CLASS-244-137.4; US-PATENT-CLASS-244-118.1; US-PATENT-CLASS-244-130; INT-PATENT-CLASS-B64C-7/00; INT-PATENT-CLASS-B64D-1/02)
Avail: US Patent and Trademark Office CSCL 01C

A device is disclosed for reducing drag and store separation difficulties caused by shallow cavities on aircraft in supersonic flight consisting of a slab of porous material cut to fitprecisely inside the cavity.This slab is mounted inside the cavity such that a plenum

chamber is formed between the slab and the floor of the cavity. This device allows air to flow through the chamber opposite to the direction of flow outside the chamber. This results in reduced drag and improved store separation characteristics.

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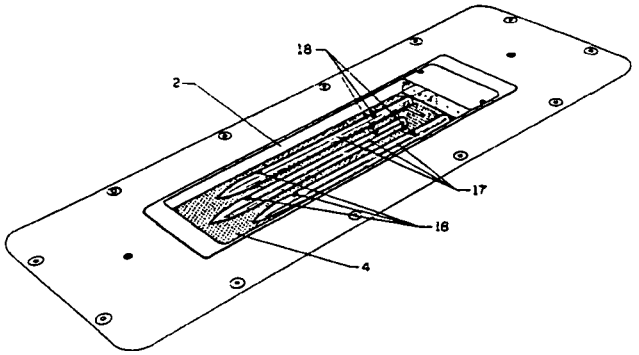

N91-31140* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
ROTATABLE NON-CIRCULAR FOREBODY FLOW CONTROLLER Patent
CARY A. MOSKOVITZ, inventor (to NASA) 24 Sep. 1991 11 p Filed 10 Aug. 1990
(NASA-CASE-LAR-14212-1-CU; US-PATENT-5,050,819; US-PATENT-APPL-SN-565090; US-PATENT-CLASS-244-75R; US-PATENT-CLASS-244-87; US-PATENT-CLASS-244-88; US-PATENT-CLASS-244-199; US-PATENT-CLASS-244-120; INT-PATENT-CLASS-B64C-19/00) Avail: US Patent and Trademark Office CSCL 01C

The invention is a rotatable, non-circular forebody flow controller. The apparatus comprises a small geometric device located at a nose of a forebody of an aircraft and a non-circular cross-sectional area that extends toward the apex of the aircraft. The device is symmetrical about a reference plane and preferably attaches to an axle which in turn attaches to a rotating motor. The motor rotates the device about an axis of rotation. Preferably, a control unit connected to an aircraft flight control computer signals to the rotating motor the proper rotational positioning of the geometric device.

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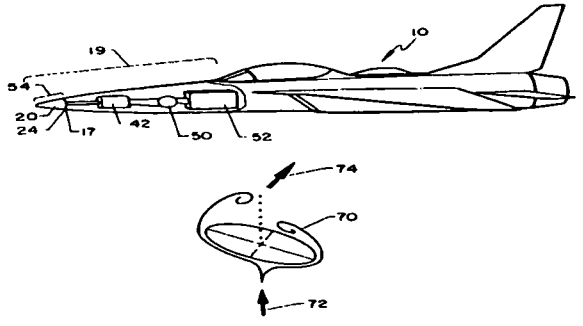


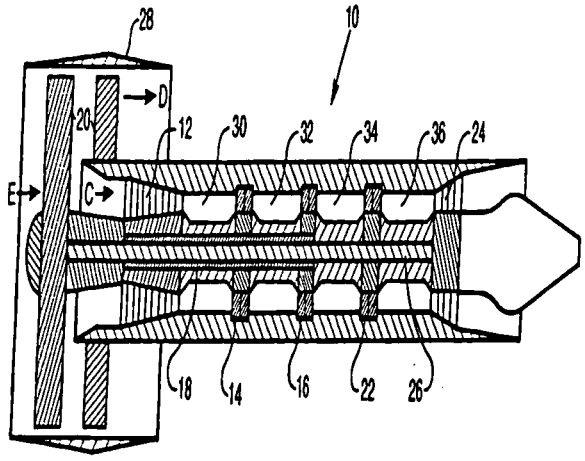
07
AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft.

N91-23180*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
MULTI-HEAT ADDITION TURBINE ENGINE Patent Application
LEO C. FRANCISCUS, inventor (to NASA) and THEODORE A. BRABBS, inventor (to NASA) (Sverdrup Technology, Inc., Brook Park, OH.) 30 Jan. 1991 12 p
(NASA-CASE-LEW-15094-1; NAS 1.71:LEW-15094-1; US-PATENT-APPL-SN-647902) Avail: NTIS HC/MF A03 CSCL 21E

A multi-heat addition turbine engine (MHATE) incorporates a plurality of heat addition devices to transfer energy to air and a plurality of turbines to extract energy from the air while converting it to work. The MHATE provides dry power and lower fuel consumption or lower combustor exit temperatures.

NASA



09
RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands.

N91-21157* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
HIGH-PRESSURE PROMOTED COMBUSTION CHAMBER Patent
MICHELLE A. RUCKER, inventor (to NASA) and JOEL M. STOLTZFUS, inventor (to NASA) 5 Feb. 1991 11 p Filed 18 Jul. 1989 Supersedes N90-16771 (28 - 9, p 1170)
(NASA-CASE-MSC-21470-1; US-PATENT-4,990,312; US-PATENT-APPL-SN-381239; US-PATENT-CLASS-422-78; US-PATENT-CLASS-422-80; US-PATENT-CLASS-422-104; US-PATENT-CLASS-374-8; US-PATENT-CLASS-73-865.6;

INT-PATENT-CLASS-G01N-31/12) Avail: US Patent and Trademark Office CSCL 14B

In the preferred embodiment of the promoted combustion chamber disclosed herein, a thick-walled tubular body that is capable of withstanding extreme pressures is arranged with removable upper and lower end closures to provide access to the chamber for dependently supporting a test sample of a material being evaluated in the chamber. To facilitate the real-time analysis of a test sample, several pressure-tight viewing ports capable of withstanding the simulated environmental conditions are arranged in the walls of the tubular body for observing the test sample during the course of the test. A replaceable heat-resistant tubular member and replaceable flame-resistant internal liners are arranged to be fitted inside of the chamber for protecting the interior wall surfaces of the combustion chamber during the evaluation tests. Inlet and outlet ports are provided for admitting high-pressure gases into the chamber as needed for performing dynamic analyses of the test sample during the course of an evaluation test.

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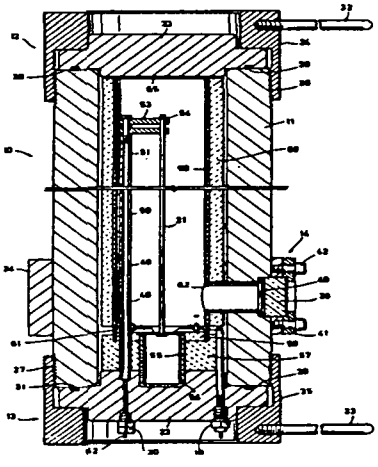


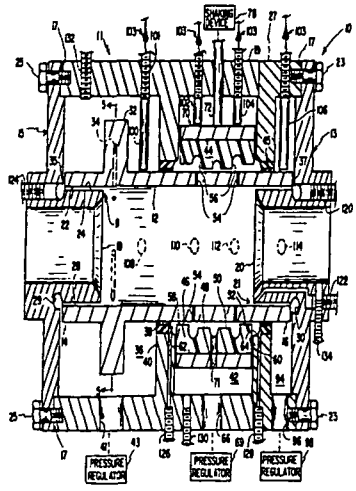
N91-25155*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

DYNAMIC TESTER FOR ROTOR SEALS AND BEARINGS Patent Application

GEORGE L. VONPRAGENAU, inventor (to NASA) 1 Apr. 1991 14 p (NASA-CASE-MFS-28493-1; NAS 1.71:MFS-28493-1; US-PATENT-APPL-SN-678780) Avail: NTIS HC/MF A03 CSCL14B

A dynamic tester for testing vibration damping seals and bearings is constructed having a hollow shaft extending through the seal or bearing, with the shaft internally supported at each end by fluid bearings on hollow bosses connected to an interior of an enclosure, with no rolling members connected to the shaft is described. A high pressure working fluid is forced through the hollow bosses to operate the bearings. Additionally, the shaft is provided with a reaction turbine that angularly vents a portion of the high pressure working fluid in order to rotate the shaft at high speed, up to 40,000 rpm. The seal or bearing is mounted in a bushing, in turn supported by rods to a shaking device that vibrates the seal or bearing as the shaft is rotated. A plurality of proximity sensors are mounted from outside the enclosure to sense shaft and seal bushing vibrations, and a plurality of pressure ports are disposed in the enclosure to allow sensing of dynamic and static pressures of the testing apparatus.

NASA



N91-26159*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

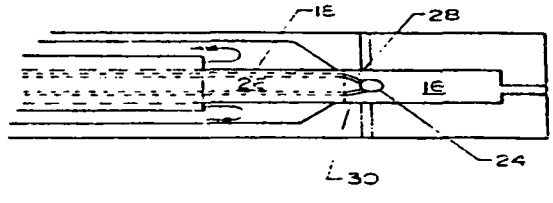
LIQUID COOLED SUPERSONIC TOTAL TEMPERATURE PROBE Patent Application

NICHOLAS T. LAGEN, inventor (to NASA) (George Washington Univ., Hampton, VA.) and GARLAND D. REECE, inventor (toNASA) 23 Apr. 1991 32 p

(NASA-CASE-LAR-14435-1-CU; NAS 1.71:LAR-14435-1-CU; US-PATENT-APPL-SN-690144) Avail: NTIS HC/MF A03 CSCL 14B

A total temperature probe is provided for use in a supersonic environment. An outer shell, which can be L-shaped, defines an internal chamber and test chamber. The test chamber is located at a distal end of the outer shell and has a test inlet. A thermocouple is located within the internal chamber and has a temperature of the supersonic external flow environment. A portion of the thermocouple adjacent to the thermocouple distal end forms a liquid tight seal between the reservoir and the test chamber. A supply tube is provided for supplying a liquid coolant through the internal chamber and terminates at the thermocouple portion adjacent to the thermocouple distal end and an exit conduit is provided for removing liquid coolant from the reservoir. The outer shell of the probe is thus internally cooled by the liquid coolant when being subjected to intense supersonic temperatures of up to 2000 F. The novelty of the invention lies in the unique structure which permits effective cooling of a total temperature probe.

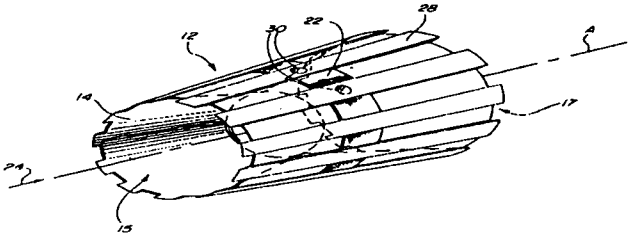
NASA



N91-28175*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
IMPROVED METHOD AND APPARATUS FOR MACH NUMBER CHANGE IN WIND TUNNEL Patent Application
RICHARD L. PUSTER, inventor (to NASA) 26 Jun. 1991 15 p (NASA-CASE-LAR-13548-1; NAS 1.71:LAR-13548-1; US-PATENT-APPL-SN-721039) Avail: NTIS HC/MF A03 CSCL 14B

A description of an insert in a wind tunnel nozzle is presented. The insert has a variable sized passageway that helps create two pressure regions which, in turn, create a diffusion shock wave system and a compression wave system with each system having a plurality of waves. The diffusion shock wave system compresses a flow while the compression wave system turns the flow and is attenuated by the flow itself.

NASA



N91-32149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
NOZZLE DIFFUSER FOR USE WITH AN OPEN TEST SECTION OF A WIND TUNNEL Patent Application
P. STEPHEN BARNA, inventor (to NASA) (Barna, P. Stephen, Consultant, Norfolk, VA) 8 Aug. 1991 16 p (NASA-CASE-LAR-14424-1-SB; NAS 1.71:LAR-14424-1-SB; US-PATENT-APPL-SN-743468) Avail: NTIS HC/MF A03 CSCL 14B

The nozzle diffuser has an inlet in fluid communication with the narrowed inlet of an open test chamber in a conventional wind tunnel. The nozzle diffuser has a passageway extending from its inlet to an outlet in communication with the open test section. The passageway has an internal cross sectional area which increases from its inlet to its outlet and which may be defined by top and bottom isosceles trapezoid walls of a particular flare angle and by isosceles trapezoid side walls of a different flare angle. In addition, a collector having a decreasing internal cross sectional area from inlet to outlet may be provided at the opposite end of the test chamber such that its outlet is in communication with a diffuser located at this outlet.

NASA

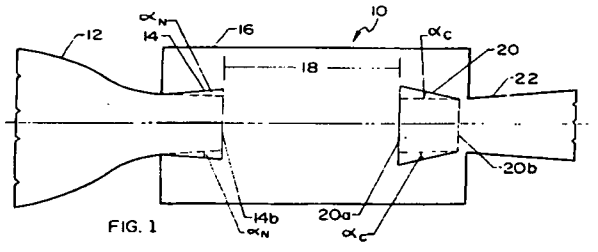


FIG. 1

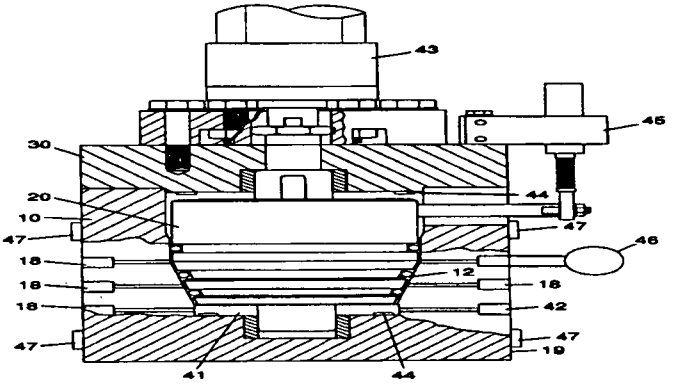
14
GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

N91-21175* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
O-RING GASKET TEST FIXTURE Patent
JAMES ERIC TURNER, inventor (to NASA) and DONALD SCOTT MCCLUNEY, inventor (to NASA) 19 Mar. 1991 9 p Filed 5 Jun. 1989 Supersedes N89-28546 (27 - 23, p 3253) (NASA-CASE-MFS-28376-1; US-PATENT-5,000,033; US-PATENT-APPL-SN-361479; US-PATENT-CLASS-73-49.8; INT-PATENT-CLASS-G01M-3/28) Avail: US Patent and Trademark Office CSCL 14B

An apparatus is presented for testing O-ring gaskets under a variety of temperature, pressure, and dynamic loading conditions. Specifically, this apparatus has the ability to simulate a dynamic loading condition where the sealing surface in contact with the O-ring moves both away from and axially along the face of the O-ring.

Official Gazette of the U.S. Patent and Trademark Office

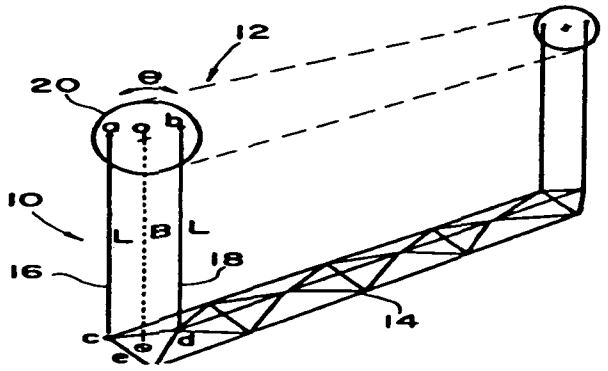


N91-21176* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
TORSIONAL SUSPENSION SYSTEM FOR TESTING SPACE STRUCTURES Patent
WILMER H. REED, III, inventor (to NASA) and RONALD R. GOLD, inventor (to NASA) 26 Feb. 1991 6 p Filed 26 May 1989 Supersedes N89-28547 (27 - 23, p 3253) (NASA-CASE-LAR-14149-1-SB; US-PATENT-4,995,272; US-PATENT-APPL-SN-357757; US-PATENT-CLASS-73-865.6; US-PATENT-CLASS-73-866.4; US-PATENT-CLASS-73-663; INT-PATENT-CLASS-G01M-7/02; INT-PATENT-CLASS-G01M-19/00) Avail: US Patent and Trademark Office CSCL 14B

A low frequency torsional suspension system for testing a space structure uses a plurality of suspension stations attached to the space structure along the length thereof in order to suspend the space structure from an overhead support. Each suspension station includes a disk pivotally mounted to the overhead support, and two cables which have upper ends connected to the disk and lower ends connected to the space structure. The two cables define a parallelogram with the center of gravity of the space structure being vertically beneath the pivot axis of the disk. The

vertical distance between the points of attachment of the cables to the disk and the pivot axis of the disk is adjusted to lower the frequency of the suspension system to a level which does not interfere with frequency levels of the space structure, thereby enabling accurate measurement.

Official Gazette of the U.S. Patent and Trademark Office



N91-27175* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

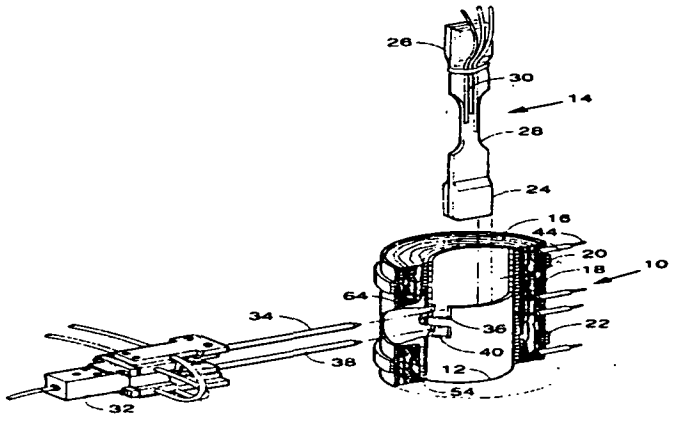
FURNACE FOR TENSILE/FATIGUE TESTING Patent

PAMELA K. BRINDLEY, inventor (to NASA) 14 May 1991 11 p Filed 19 Mar. 1990

(NASA-CASE-LEW-14848-1; US-PATENT-5,015,825; US-PATENT-APPL-SN-382885; US-PATENT-CLASS-219-390; US-PATENT-CLASS-73-826; US-PATENT-CLASS-374-49;US-PATENT-CLASS-374-50; INT-PATENT-CLASS-F27B-5/14; INT-PATENT-CLASS-F27D-11/10; INT-PATENT-CLASS-G01N-3/08) Avail: US Patent and Trademark Office CSCL 14B

Mechanical properties of short test specimens are tested in tension and fatigue using an improved electrical resistance heating furnace having a short length that mounts between the grips of a typical testing machine. The furnace includes a ceramic inner liner having an oval cross section to reduce heat loss at the ends. The furnace is divided into a plurality of individually controlled heating zones. Provision is made to supply an inert gas to the volume around the specimen in the center of the furnace.

Official Gazette of the U.S. Patent and Trademark Office



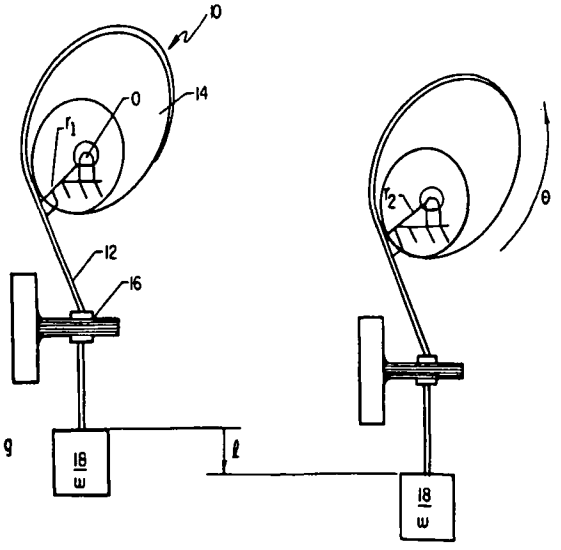
N91-28184*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SUSPENSION DEVICE FOR LOW-FREQUENCY STRUCTURES Patent Application

MENG-SANG CHEW, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.), JER-NAN JUANG, inventor (to NASA), and LI-FARN YANG, inventor (to NASA) 28 Mar. 1991 19 p (NASA-CASE-LAR-14272-1-CU; NAS 1.71:LAR-14272-1-CU; US-PATENT-APPL-SN-678553) Avail: NTIS HC/MF A03 CSCL 14B

A suspension device is provided for simulating the free-free boundary conditions of space for a low frequency structure. A support cable is connected at one end to the test structure and is vertically guided by a guiding ring. The other end of the cable is connected to a cam having an outer circumference which supports the cable. A drive axle passes through the cam center of rotation and is rotatably journalled in a suitable manner to a rigid structure. Two torsion springs are provided about the drive axle. One end of each spring is connected to a respective face of the cam and the other end is connected to the fixed support. The cam is shaped and the torsion springs selected such that Wr(sub (t)) = T(sub s(t)), wherein W is the weight of the test structure; r(sub (t)) is the instantaneous moment arm defined as the perpendicular distance from the rotational center of the cam to the cable at time t, and T(sub s(t)) is the total spring torque exerted by the two springs on the cam at time t. The test structure is accordingly vertically suspended by the cable and the instantaneous moment arm compensates for any increased spring torque arising from a vertical displacement of the test structure to simulate space conditions.

NASA



16
SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques.

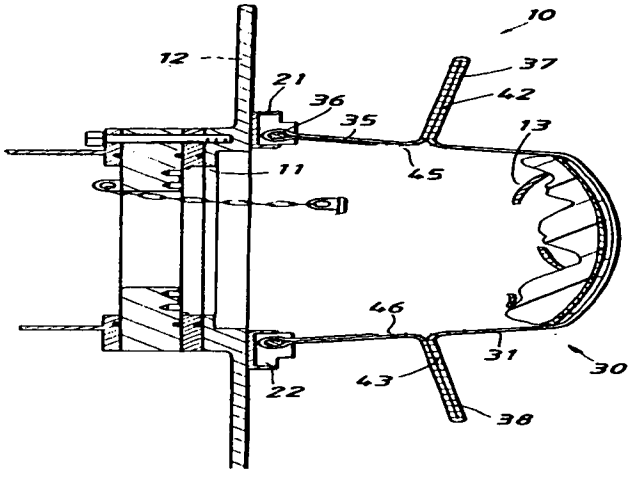
N91-24216*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

LOAD LIMITING, ENERGY ABSORBING, LIGHTWEIGHT DEBRIS CATCHER Patent Application

JON B. KAHN, inventor (to NASA) and WILLIAM C. SCHNEIDER, inventor (to NASA) 22 Feb. 1991 25 p (NASA-CASE-MSC-21562-1; NAS 1.71:MSC-21562-1; US-PATENT-APPL-SN-658911) Avail: NTIS HC/MF A03 CSCL 22B

In the representative embodiment of the invention disclosed a load limiting, energy absorbing net is arranged to overlay a normally-covered vent opening in the rear bulkhead of the space orbiter vehicle. Spatially-disposed flexible retainer straps are extended from the net and respectively secured to bulkhead brackets spaced around the vent opening. The intermediate portions of the straps are doubled over and stitched together in a pattern enabling the doubled-over portions to progressively separate at a predicable load designed to be well below the tensile capability of the straps as the stitches are successively torn apart by the forces imposed on the retainer members whenever the cover plate is explosively separated from the bulkhead and propelled into the net. By arranging these stitches to be successively torn away at a load below the strap strength in response to forces acting on the retainers that are less than the combined strength of the retainers, this tearing action serves as a predictable compact energy absorber for safely halting the cover plate as the retainers are extended as the net is deployed. The invention further includes a block of an energy-absorbing material positioned in the net for receiving loose debris produced by the explosive release of the cover plate.

NASA



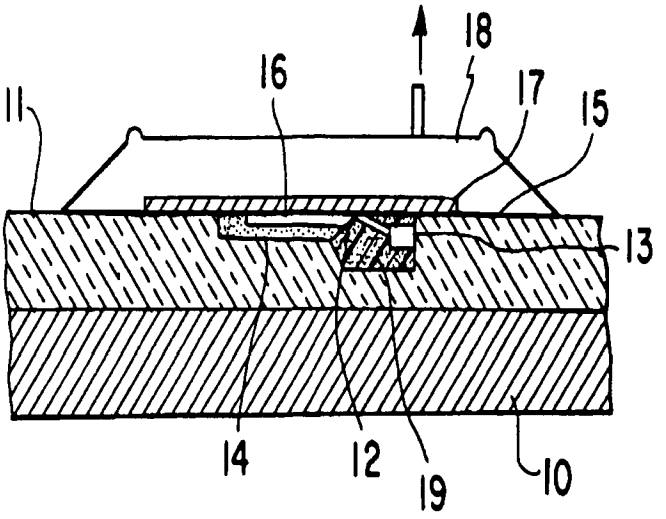
N91-28186*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

THERMALLY ACTIVATED RETAINER MEANS Patent Application

MARGARET E. GRIMALDI, inventor (to NASA) and LESLIE S. HERTZ, inventor (to NASA) 15 Jul. 1991 15 p (NASA-CASE-MSC-21793-1; NAS 1.71:MSC-21793-1; US-PATENT-APPL-SN-731829) Avail: NTIS HC/MF A03 CSCL 22B

A retainer member suitable for retaining a gap filler placed in gaps between adjacent tile members is presented. One edge of the retainer member may be attached to the gap filler and another edge may be provided with a plurality of tab members which in an intermediate position do not interfere with placement or removal of the gap filler between tile members. The retainer member may be fabricated from a shape memory alloy which when heated to a specified memory temperature will thermally activate the tab members to predetermined memory positions engaging the tile members to retain the gap filler in the gap. This invention has particular application to the thermal tiles on space vehicles such as the Space Shuttle Orbiter.

NASA



18
SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

N91-21221* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

OVERCENTER COLLET SPACE STATION TRUSS FASTENER Patent

PHILIP L. SHERIDAN, inventor (to NASA) 12 Mar. 1991 10 p Filed 30 Apr. 1990 Supersedes N90-26859 (28 - 21, p 2966) (NASA-CASE-MSC-21504-1; US-PATENT-4,998,842; US-PATENT-APPL-SN-516856; US-PATENT-CLASS-403-252; US-PATENT-CLASS-403-171; US-PATENT-CLASS-403-176; US-PATENT-CLASS-52-646; INT-PATENT-CLASS-B25G-3/00) Avail: US Patent and Trademark Office CSCL 22B

A quick-connect fastener is arranged with a tubular body that is arranged to be engaged against the exterior surface of a hollow attachment fitting and coincidentally aligned with an opening in the fitting. A collet having normally-contracted fingers with outwardly-enlarged ends is operatively arranged in the body to be moved forwardly by an expander member mounted in the tubular body for advancing the collet fingers through the opening in the attachment fitting. Biasing means are arranged between the expander member and a toggle linkage in the tubular body which is selectively operated to urge the expander member forwardly into engagement with the collet fingers with an initial biasing force

to advance their forward portions through the body opening and then expand them outwardly. The biasing means also provide a subsequent biasing force for retaining the collet members in their expanded positions once their enlarged forward end portions are on the opposite side of the body.

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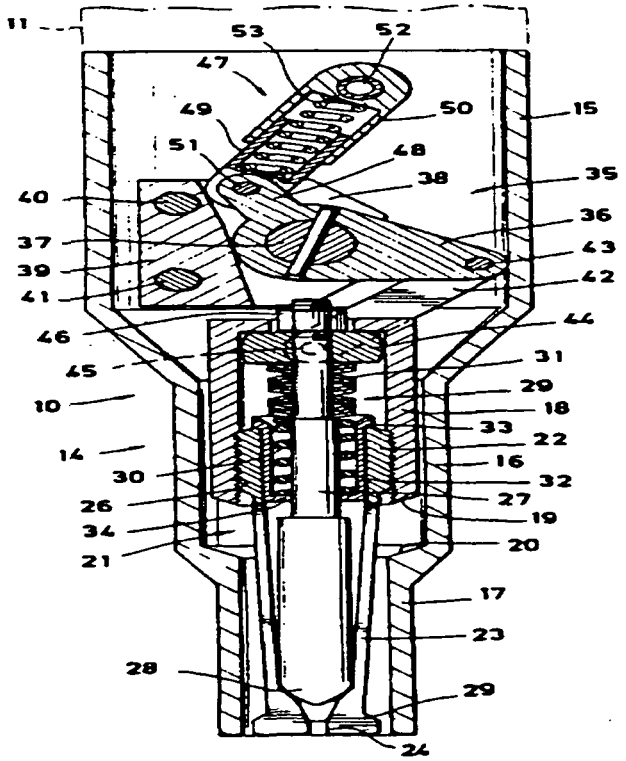

N91-21222* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

ORBITAL DEBRIS SWEEPER AND METHOD Patent

ANDREW J. PETRO, inventor (to NASA) 12 Feb. 1991 7 p Filed 16 Feb. 1990 Supersedes N90-26860 (28 - 21, p 2966) (NASA-CASE-MSC-21534-1; US-PATENT-4,991,788; US-PATENT-APPL-SN-480985; US-PATENT-CLASS-244-158R; US-PATENT-CLASS-244-14; INT-PATENT-CLASS-B24G-1/00) Avail: US Patent and Trademark Office CSCL 22B

An orbital debris sweeper is provided for removing particles from orbit which otherwise may impact and damage an orbiting spacecraft. The debris sweeper includes a central sweeper core which carries a debris monitoring unit, and a plurality of large area impact panels rotatable about a central sweeper rotational axis. In response to information from the debris monitoring unit, a computer determines whether individual monitored particles preferably impact one of the rotating panels or pass between the rotating panels. A control unit extends or retracts one or more booms which interconnect the sweeper core and the panels to change the moment of inertia of the sweeper and thereby the rotational velocity of the rotating panels. According to the method of the present invention, the change in panel rotational velocity increases the frequency of particles which desirably impact one of the panels and are thereby removed from orbit, while large particles which may damage the impact panels pass between the trailing edge of one panel and the leading edge of the rotationally succeeding panel.

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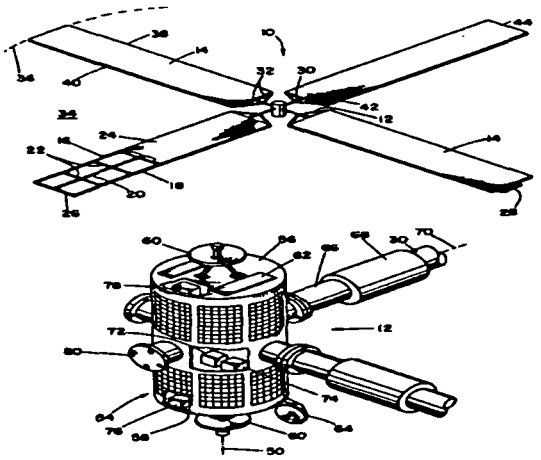


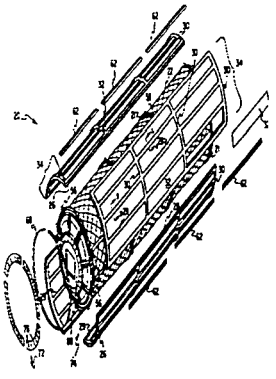
N91-25167*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

THERMALLY ISOLATED DEPLOYABLE SHIELD FOR SPACECRAFT Patent Application

JOHN W. REDMON, JR., inventor (to NASA), ANDRE E. MILLER, inventor (to NASA), BOBBY E. LAWSON, inventor (to NASA), and WILLIAM E. COBB, inventor (to NASA) 18 Apr. 1991 25 p (NASA-CASE-MFS-28524-1; NAS 1.71:MFS-28524-1; US-PATENT-APPL-SN-691610) Avail: NTIS HC/MF A03 CSCL 22B

A thermally isolated deployable shield for spacecraft is provided utilizing a plurality of lattice panels stowable generally against the craft and deployable to some fixed distance from the craft. The lattice panels are formed from replaceable shield panels affixed to lattice structures. The lattice panels generally encircle the craft providing 360 degree coverage therearound. Actuation means are provided from translating the shield radially outward from the craft and thermally isolating the shield from the craft. The lattice panels are relatively flexible, allowing the shield to deploy to variable diameters while retaining uniform curvature thereof. Restraining means are provided for holding the shield relatively tight in its stowed configuration. Close-out assemblies provide light sealing and protection of the annular spaces between the deployed shield and the crafts end structure.

NASA



N91-27199* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SYNCHRONOUSLY DEPLOYABLE DOUBLE FOLD BEAM AND PLANAR TRUSS STRUCTURE Patent
MARVIN D. RHODES, inventor (to NASA) and JOHN M. HEDGEPETH, inventor (to NASA) (Astro Research Corp., Carpinteria, CA.) 21 May 1991 14 p Filed 22 Aug. 1986
(NASA-CASE-LAR-13490-1; US-PATENT-5,016,418; US-PATENT-APPL-SN-899683; US-PATENT-CLASS-52-646; US-PATENT-CLASS-403-72; INT-PATENT-CLASS-E04H-12/18) Avail: US Patent and Trademark Office CSCL 22B

A deployable structure that synchronously deploys in both length and width is disclosed which is suitable for use as a structural component for orbiting space stations or large satellites. The structure is designed with maximum packing efficiency so that large structures may be collapsed and transported in the cargo bay of the Space Shuttle. The synchronous deployment feature allows the structure to be easily deployed in space by two astronauts, without a complex deployment mechanism. The structure is made up of interconnected structural units, each generally in the shape of a parallelepiped. The structural units are constructed of structural members connected with hinged and fixed connections at connection nodes in each corner of the parallelepiped. Diagonal members along each face of the parallelepiped provide structural rigidity and are equipped with mid-length, self-locking hinges to allow the structure to collapse. The structure is designed so that all hinged connections may be made with simple clevis-type hinges requiring only a single degree of freedom, and each hinge pin is located along the centerline of its structural member for increased strength and stiffness.

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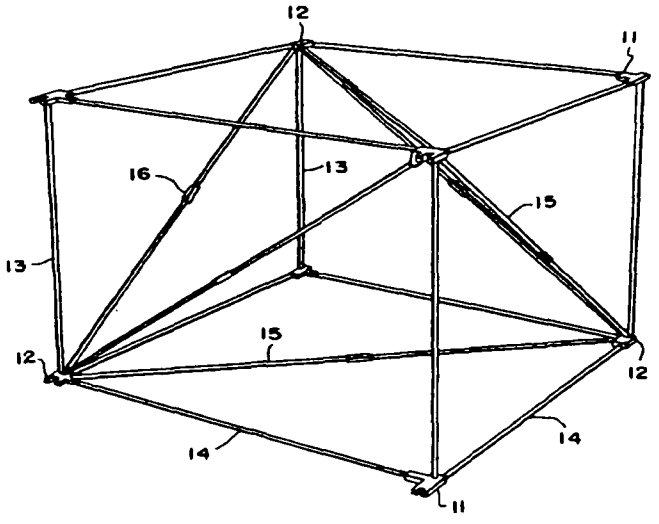

N91-27200* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
STANDARD REMOTE MANIPULATOR SYSTEM DOCKING TARGET AUGMENTATION FOR AUTOMATED DOCKING Patent
RICHARD W. DABNEY, inventor (to NASA), RICHARD T. HOWARD, inventor (to NASA), and THOMAS C. BRYAN, inventor (to NASA) 4 Jun. 1991 12 p Filed 20 Feb. 1990
(NASA-CASE-MFS-28419-1; US-PATENT-5,020,876; US-PATENT-APPL-SN-431538; US-PATENT-CLASS-350-102; US-PATENT-CLASS-350-97; US-PATENT-CLASS-350-107; INT-PATENT-CLASS-G02B-5/122) Avail: US Patent and Trademark Office CSCL 22B

A docking target is provided for use in automated docking of a first vehicle on which the target is located. The target comprises a pair of laterally extending arm portions lying in substantially the same plane and a central post extending outwardly from the plane of the arm portions. At least three reflectors are located on the target. Two of the reflectors are located at the outboard ends of the arms portions and another reflector is located at the end of the central post. In an important embodiment, the reflectors comprise individual pieces of retroreflective tape. The reflectors, when viewed from the front of the target, are aligned along the longitudinal center line of the target, and can take a number of different shapes including circular or square.

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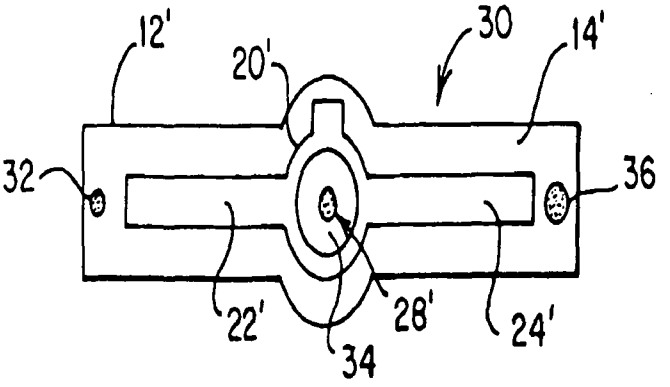

N91-27201* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
NANO-G RESEARCH LABORATORY FOR A SPACECRAFT Patent
FRIEDRICH O. VONBUN, inventor (to NASA) and OWEN K. GARRIOTT, inventor (to NASA) 4 Jun. 1991 7 p Filed 28 Apr. 1989
(NASA-CASE-GSC-13197-1; US-PATENT-5,020,743; US-PATENT-APPL-SN-344872; US-PATENT-CLASS-244-159; INT-PATENT-CLASS-B64G-1/42) Avail: US Patent and Trademark Office CSCL 22B

An acceleration free research laboratory is provided that is confined within a satellite but free of any physical engagement with the walls of the satellite, wherein the laboratory has adequate power, heating, cooling, and communications services to conduct basic research and development. An inner part containing the laboratory is positioned at the center-of-mass of a satellite within the satellite's outer shell. The satellite is then positioned such that its main axes are in a position parallel to its flight velocity vector or in the direction of the residual acceleration vector. When the satellite is in its desired orbit, the inner part is set free so as to follow that orbit without contacting the inside walls of the outer shell. Sensing means detect the position of the inner part with respect to the outer shell, and activate control rockets to move the outer shell; thereby, the inner part is repositioned such that it is correctly positioned at the center-of-mass of the satellite. As a consequence, all disturbing forces, such as drag forces, act on the outer shell, and the inner part containing the laboratory is shielded and is affected only by gravitational forces. Power is supplied to the inner part and to the laboratory by a balanced microwave/laser link which creates the kind of environment

necessary for basic research to study critical phenomena such as the Lambda transition in helium and crystal growth, and to perform special metals and alloys research, etc.

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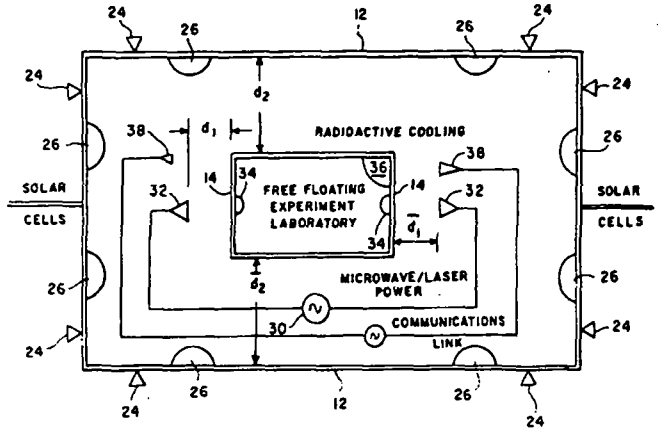


20
SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

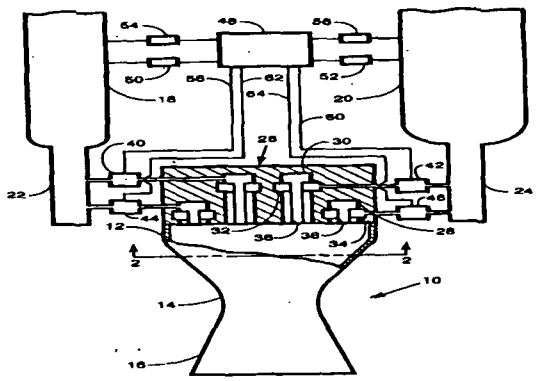
N91-26200*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

METHOD OF INJECTING FLUID PROPELLANTS INTO A ROCKET COMBUSTION CHAMBER Patent Application

STEVEN J. SCHNEIDER, inventor (to NASA) 31 May 1991 9 p (NASA-CASE-LEW-14846-2; NAS 1.71:14846-2; US-PATENT-APPL-SN-709907) Avail: NTIS HC/MF A02 CSCL 21H

A rocket injector is provided with multiple sets of manifolds for supplying propellants to injector elements. Sensors transmit the temperatures of the propellants to a suitable controller which is operably connected to valves between these manifolds and propellant storage tanks. Additional valves are opened to furnish propellants to more of the manifolds when cryogenic propellant temperatures are sensed. Only a portion of the valves are opened to furnish propellants to some of the manifolds when lower temperatures are sensed.

NASA



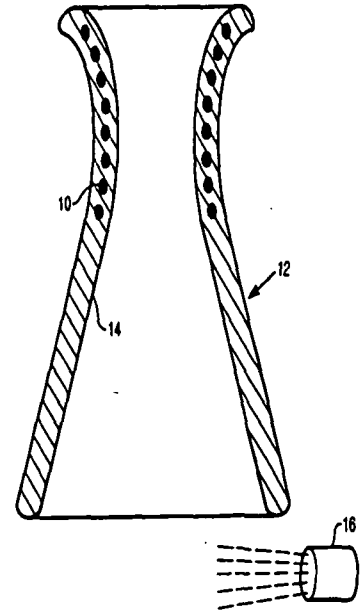
N91-32167*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

SPECTROSCOPIC WEAR DETECTOR Patent Application

GEORGE C. MADZSAR, inventor (to NASA) 27 Jun. 1991 12 p (NASA-CASE-LEW-15200-1; NAS 1.71:LEW-15200-1; US-PATENT-APPL-SN-722446) Avail: NTIS HC/MF A03 CSCL 21H

The elemental composition of a material exposed to hot gases and subjected to wear is determined. Atoms of an elemental species not appearing in this material are implanted in a surface at a depth based on the maximum allowable wear. The exhaust gases are spectroscopically monitored to determine the exposure of these atoms when the maximum allowable wear is reached.

NASA



23
CHEMISTRY AND MATERIALS (GENERAL)

N91-23237*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

POLY(1,3,4-OXADIAZOLES) VIA AROMATIC NUCLEOPHILIC DISPLACEMENT Patent Application

JOHN W. CONNELL, inventor (to NASA), PAUL M. HERGENROTHER, inventor (to NASA), and PETER WOLF, inventor (to NASA) (Badische Anilin- und Soda-Fabrik A.G., Mogendorf, Germany, F.R.) 22 Jan. 1991 20 p (NASA-CASE-LAR-14427-1; NAS 1.71:LAR-14427-1; US-PATENT-APPL-SN-645089) Avail: NTIS HC/MF A03 CSCL 07A

Poly(1,3,4-oxadiazoles) (POX) are prepared by the aromatic nucleophilic displacement reaction of di(hydroxyphenyl) 1,3,4-oxadiazole monomers with activated aromatic dihalides or activated aromatic dinitro compounds. The polymerizations are carried out in polar aprotic solvents such as sulfolane or diphenylsulfone using alkali metal bases such as potassium carbonate at elevated temperatures under nitrogen. The di(hydroxyphenyl) 1,3,4-oxadiazole monomers are synthesized by reacting 4-hydroxybenzoic hydrazide with phenyl 4-hydrobenzoate in the melt and also by reacting aromatic dihydrazides with two moles of phenyl 4-hydroxybenzoate in the melt. This synthetic route has provided high molecular weight POX of new chemical

structure, is economically and synthetically more favorable than other routes, and allows for facile chemical structure variation due to the large variety of activated aromatic dihalides which are available.
NASA

N91-25185* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
SUBSTITUTED 1,1,1-TRIARYL-2,2,2-TRIFLUOROETHANES AND PROCESSES FOR THEIR SYNTHESIS Patent
WILLIAM B. ALSTON, inventor (to NASA) and ROY F. GRATZ, inventor (to NASA) 30 Apr. 1991 10 p Filed 10 Oct. 1989 Division of US-Patent-Appl-SN-292049, filed 30 Dec. 1988 (NASA-CASE-LEW-14345-4; US-PATENT-5,011,955; US-PATENT-APPL-SN-419554; US-PATENT-APPL-SN-292049; US-PATENT-CLASS-552-101; US-PATENT-CLASS-552-108; US-PATENT-CLASS-552-110; US-PATENT-CLASS-552-113; US-PATENT-CLASS-552-115; INT-PATENT-CLASS-C07C-15/16) Avail: US Patent and Trademark Office CSCL 07A

Synthetic procedures are described for tetraalkyls, tetraacids, and dianhydrides substituted 1,1,1-triaryl-2,2,2-trifluoroethanes which comprises: (1) 1,-bis(dialkylaryl)-1-aryl-2,2,2, trifluororthane, (2) 1,1-bis(dicarboxyaryl) 1aryl-2,2,2 trifluoroethane, or (3) cyclic dianhydride or diamine of 1,1-bis (dialkylarly) 1-aryl-2,2,2 trifluoroethanes. The synthesis of (1) is accomplished by the condensation reaction of an aryltrifluoromethyl ketone with a dialkylaryl compound. The synthesis of (2) is accomplished by oxidation of (1). The synthesis dianhydride of (3) is accomplished by the conversion of (2) to its corresponding cyclic dianhydride. The synthesis of the diamine is accomplished by the similar reaction of an aryltrifluoromethyl ketone with aniline or alkyl substituted or disubstituted anilines. Also, other derivatives of the above are formed by nucleophilic displacement reactions.
Official Gazette of the U.S. Patent and Trademark Office

N91-27220* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
LOW DIELECTRIC FLUORINATED POLY(PHENYLENE ETHER KETONE) FILM AND COATING Patent
PATRICK E. CASSIDY, inventor (to NASA), GORDON L. TULLOS, inventor (to NASA), and ANNE K. ST.CLAIR, inventor (to NASA) 20 Feb. 1990 16 p Filed 23 Sep. 1988 (NASA-CASE-LAR-13992-1-CU; US-PATENT-4,902,769; US-PATENT-APPL-SN-248009; US-PATENT-CLASS-528-125; US-PATENT-CLASS-528-126; US-PATENT-CLASS-528-128; US-PATENT-CLASS-528-219; US-PATENT-CLASS-528-220; INT-PATENT-CLASS-C08G-8/02; INT-PATENT-CLASS-C08G-14/00) Avail: US Patent and Trademark Office CSCL 07A

The present invention relates to film and coating materials prepared from novel fluorinated poly(phenylene ether ketones). A fluorinated poly(phenylene ether ketone) is prepared by reacting a bisphenol with 1,1,1,3,3,3 hexafluoro-2,2-bis 4-(4-halobenzoyl) phenyl propane (wherein halo is fluoro or chloro), which is a novel monomer formed as the reaction product of halobenzene (wherein halo is fluoro or chloro) and 1,1,1,3,3,3 hexafluoro-2,2-bis (p-chloro formyl phenyl) propane. Especially beneficial results of this invention are that films and coating materials prepared from the novel fluorinated poly(phenylene ether ketone) are essentially optically transparent/colorless and have a lower dielectric constant than otherwise comparable, commercially available poly(phenylene ether ketones). Moreover, unlike the otherwise comparable commercially available materials, the novel fluorinated poly(phenylene ether ketones) of the present invention can be solution cast or sprayed to produce the films and coatings. Furthermore, the long term thermal stability of the polymers of the present invention is superior to that of the commercially available materials.
Official Gazette of the U.S. Patent and Trademark Office

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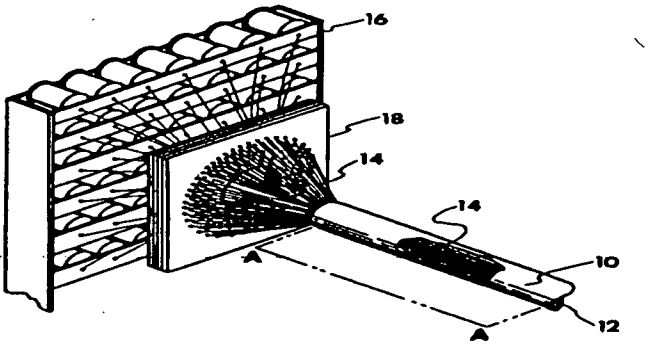
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

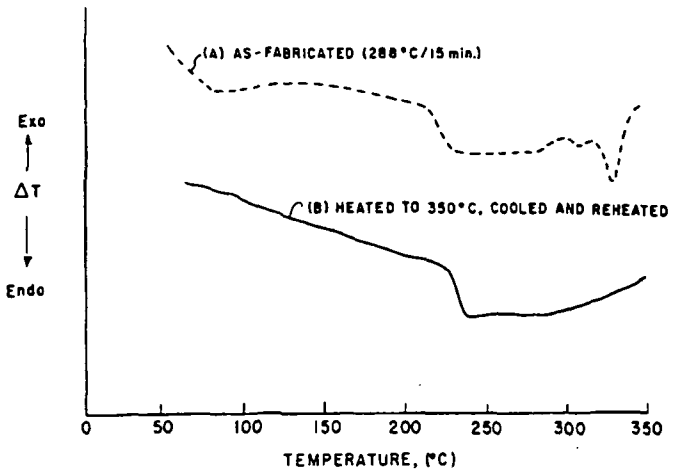
N91-25199* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PROCESS FOR THE MANUFACTURE OF SEAMLESS METAL-CLAD FIBER-REINFORCED ORGANIC MATRIX COMPOSITE STRUCTURES Patent
RAYMOND M. BLUCK, inventor (to NASA), HAROLD G. BUSH, inventor (to NASA), and ROBERT R. JOHNSON, inventor (to NASA) (Lockheed Missiles and Space Co., Sunnyvale, CA.) 16 Apr. 1991 6 p Filed 28 Feb. 1990 Division of US-Patent-Appl-SN-921572, filed 21 Oct. 1986 (NASA-CASE-LAR-13562-2; US-PATENT-5,008,061; US-PATENT-APPL-SN-486668; US-PATENT-APPL-SN-921572; US-PATENT-CLASS-264-257; US-PATENT-CLASS-264-261; US-PATENT-CLASS-156-625; US-PATENT-CLASS-156-634; US-PATENT-CLASS-156-172; US-PATENT-CLASS-156-187) Avail: US Patent and Trademark Office

A process for producing seamless metal-clad composite structures includes providing a hollow, metallic inner member and an outer sleeve to surround the inner member and define an inner space therebetween. A plurality of continuous reinforcing fibers is attached to the distal end of the outside diameter of the inner member, and the inner member is then introduced, distal end first, into one end of the outer sleeve. The inner member is then moved, distal end first, into the outer sleeve until the inner member is completely enveloped by the outer sleeve. A liquid matrix material is then injected into the space containing the reinforcing fibers between the inner member and the outer sleeve. Next a pressurized heat transfer medium is passed through the inner member to cure the liquid matrix material. Finally, the wall thickness of both the inner member and the outer sleeve are reduced to desired dimensions by chemical etching, which adjusts the thermal expansion coefficient of the metal-clad composite structure to a desired value.
Official Gazette of the U.S. Patent and Trademark Office



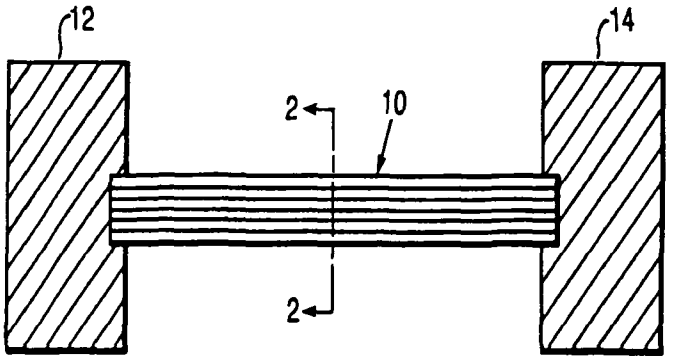
N91-25200* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PREPARING COMPOSITE MATERIALS FROM MATRICES OF PROCESSABLE AROMATIC POLYIMIDE THERMOPLASTIC BLENDS Patent
NORMAN J. JOHNSTON, inventor (to NASA), TERRY L. ST.CLAIR, inventor (to NASA), ROBERT M. BAUCOM, inventor (to NASA), and JOHN R. GLEASON, inventor (to NASA) 2 Apr. 1991 17 p Filed 21 Oct. 1988 Continuation-in-part of abandoned US-Patent-Appl-SN-105846, filed 8 Oct. 1987
(NASA-CASE-LAR-14107-1; US-PATENT-5,004,575; US-PATENT-APPL-SN-262268; US-PATENT-APPL-SN-105846; US-PATENT-CLASS-264-136; US-PATENT-CLASS-264-257; US-PATENT-CLASS-264-331.12; US-PATENT-CLASS-525-432; US-PATENT-CLASS-528-352; US-PATENT-CLASS-528-350) Avail: US Patent and Trademark Office CSCL 11D

Composite materials with matrices of tough, thermoplastic aromatic polyimides are obtained by blending semi-crystalline polyimide powders with polyamic acid solutions to form slurries, which are used in turn to prepare prepregs, the consolidation of which into finished composites is characterized by excellent melt flow during processing.
Official Gazette of the U.S. Patent and Trademark Office



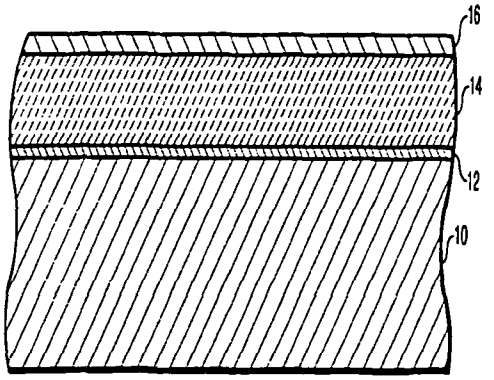
N91-25201*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
HEAT TRANSFER DEVICE Patent Application
BRUCE A. BANKS, inventor (to NASA) and JAMES R. GAIER, inventor (to NASA) 19 Feb. 1991 10 p
(NASA-CASE-LEW-14162-2; NAS 1.71:LEW-14162-2; US-PATENT-APPL-SN-657238) Avail: NTIS HC/MF A02 CSCL 11D

Gas derived graphite fibers are generated by the decomposition of an organic gas. These fibers when joined with a suitable binder are used to make a high thermal conductivity composite material. The fibers may be intercalated. The intercalate can be halogen or halide salt, alkaline metal, or any other species which contributes to the electrical conductivity improvement of the graphite fiber. The heat transfer device may also be made of intercalated highly oriented pyrolytic graphite and machined, rather than made of fibers.
NASA



N91-25202*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
METHOD OF APPLYING A THERMAL BARRIER COATING SYSTEM TO A SUBSTRATE Patent Application
ROBERT A. MILLER, inventor (to NASA) 23 May 1991 10 p
(NASA-CASE-LEW-15020-2; NAS 1.71:LEW-15020-2; US-PATENT-APPL-SN-708255) Avail: NTIS HC/MF A02 CSCL 11D

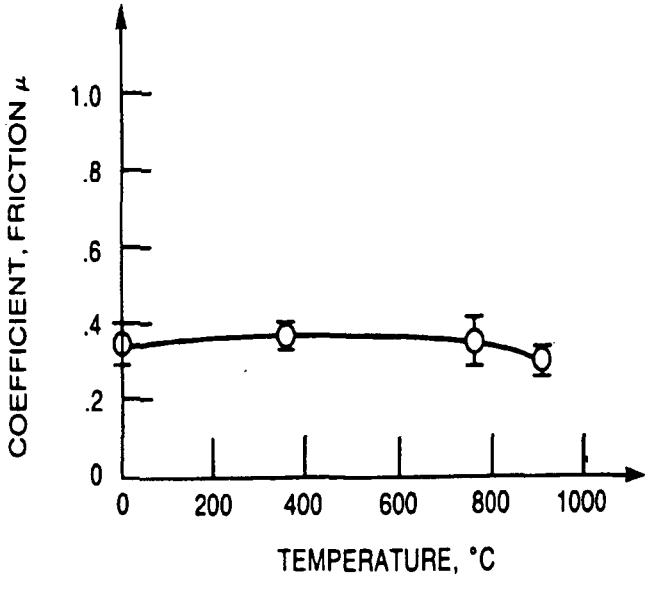
A metallic close-out layer is applied to the surface of a thermal barrier coating system to seal the ceramic material in the coating. The close-out layer is glass-bead preened to densify the surface.
NASA



N91-27244* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
METHOD OF MAKING CARBIDE/FLUORIDE/SILVER COMPOSITES Patent
HAROLD E. SLINEY, inventor (to NASA) and CHRISTOPHER DELLACORTE, inventor (to NASA) 23 Jul. 1991 10 p Filed 23 Aug. 1990
(NASA-CASE-LEW-14902-1; US-PATENT-5,034,187; US-PATENT-APPL-SN-571058; US-PATENT-CLASS-419-14; US-PATENT-CLASS-419-30; US-PATENT-CLASS-419-32; US-PATENT-CLASS-419-36; US-PATENT-CLASS-419-38; US-PATENT-CLASS-419-39; US-PATENT-CLASS-419-49) Avail: US Patent and Trademark Office CSCL 11D

A composition containing 30 to 70 percent chromium carbide, 5 to 20 percent soft noble metal, 5 to 20 percent metal fluorides, and 20 to 60 percent metal binder is used in a powdered metallurgy process for the production of self-lubricating components, such as bearings. The use of the material allows the self-lubricating bearing to maintain its low friction properties over an extended range of operating temperatures.

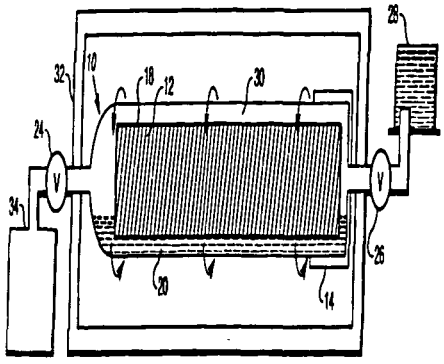
Official Gazette of the U.S. Patent and Trademark Office



N91-28289*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
APPARATUS FOR INTERCALATING LARGE QUANTITIES OF FIBROUS STRUCTURES Patent Application
JAMES R. GAIER, inventor (to NASA) 24 Jul. 1991 13 p
(NASA-CASE-LEW-15077-2; NAS 1.71:LEW-15077-2; US-PATENT-APPL-SN-735548) Avail: NTIS HC/MF A03 CSCL 11D

Apparatus for intercalating large quantities of fibrous structures uses a rotatable reaction chamber containing a liquid phase intercalate. The intercalate liquid phase is controlled by appropriately heating, cooling or pressurizing the reaction. Rotation of the chamber containing the fiber sample ensures total submergence if the fiber during intercalation. Intercalated graphite fibers having metal-like resistivities are produced and are conceivably useful as electrical conductors.

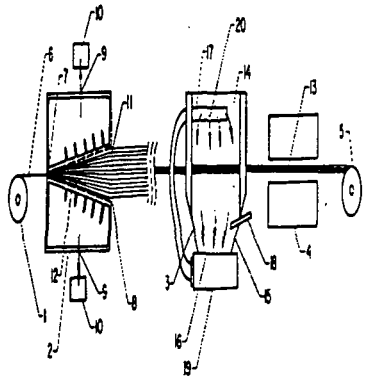
NASA



N91-28290*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PROCESS FOR APPLICATION OF POWDER PARTICLES TO FILAMENTARY MATERIALS Patent Application
ROBERT M. BAUCOM, inventor (to NASA), JOHN J. SNOHA, inventor (to NASA), and JOSEPH M. MARCHELLO, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 16 May 1990 20 p
(NASA-CASE-LAR-14231-1-CU; NAS 1.71:LAR-14231-1-CU; US-PATENT-APPL-SN-524109) Avail: NTIS HC/MF A03 CSCL 11D

This invention is a process for the uniform application of polymer powder particles to a filamentary material in a continuous manner to form a uniform composite prepreg material. A tow of the filamentary material is fed under carefully controlled tension into a spreading unit, where it is spread pneumatically into an even band. The spread filamentary tow is then coated with polymer particles from a fluidized bed, after which the coated filamentary tow is fused before take-up on a package for subsequent utilization. This process produces a composite prepreg uniformly without imposing severe stress on the filamentary material, and without requiring long, high temperature residence times for the polymer.

NASA



N91-31236* National Aeronautics and Space Administration. Pasadena Office, CA.
COMPOSITE FLEXIBLE BLANKET INSULATION Patent
DEMETRIUS A. KOURTIDES, inventor (to NASA), WILLIAM C. PITTS, inventor (to NASA), HOWARD E. GOLDSTEIN, inventor (to NASA), and PAUL M. SAWKO, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 13 Aug. 1991 39 p Filed 21 Sep. 1989 Patent jointly owned by Eloret Corp., Palo Alto, CA
(NASA-CASE-NPO-11907-1-NP; US-PATENT-5,038,693; US-PATENT-APPL-SN-410576; US-PATENT-CLASS-112-440; US-PATENT-CLASS-428-285; INT-PATENT-CLASS-B32B-7/08) Avail: US Patent and Trademark Office CSCL 11D

Composite flexible multilayer insulation systems (MLI) were evaluated for thermal performance and compared with the currently used fibrous silica (baseline) insulation system. The systems described are multilayer insulations consisting of alternating layers of metal foil and scrim ceramic cloth or vacuum metallized polymeric films quilted together using ceramic thread. A silicon carbide thread for use in the quilting and the method of making it are also described. These systems are useful in providing lightweight insulation for a variety of uses, particularly on the surface of aerospace vehicles subject to very high temperatures during flight.

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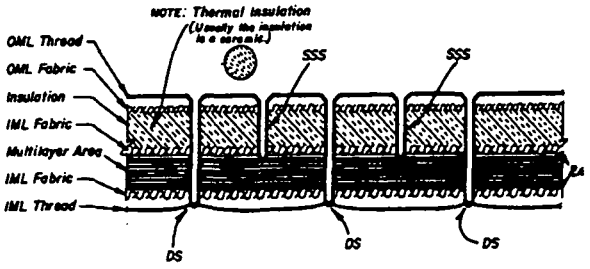

25

INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

N91-21270* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CATALYST FOR CARBON MONOXIDE OXIDATION Patent
BILLY T. UPCHURCH, inventor (to NASA), IRVIN M. MILLER, inventor (to NASA), DAVID R. BROWN, inventor (to NASA), PATRICIA P. DAVIS, inventor (to NASA), DAVID R. SCHRYER, inventor (to NASA), KENNETH G. BROWN, inventor (to NASA), and JOHN D. VANNORMAN, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 5 Feb. 1991 4 p Filed 30 Nov. 1989 Division of US-Patent-Appl-SN-298150, filed 18 Jan. 1989
(NASA-CASE-LAR-14155-2-SB; US-PATENT-4,991,181; US-PATENT-APPL-SN-443406; US-PATENT-APPL-SN-298150; US-PATENT-CLASS-372-59; US-PATENT-CLASS-423-247; US-PATENT-CLASS-502-34; US-PATENT-CLASS-502-324; INT-PATENT-CLASS-H01S-3/22) Avail: US Patent and Trademark Office CSCL 07D

A catalyst for the combination of CO and O2 to form CO2 which includes a platinum group metal, e.g., platinum; a reducible metal oxide having mulitple valence states, e.g., SnO2; and a compound which can bind water to its structure, e.g., silica gel. This catalyst is ideally suited for application to high powered, pulsed, CO2 lasers operating in a sealed or closed cycle condition.

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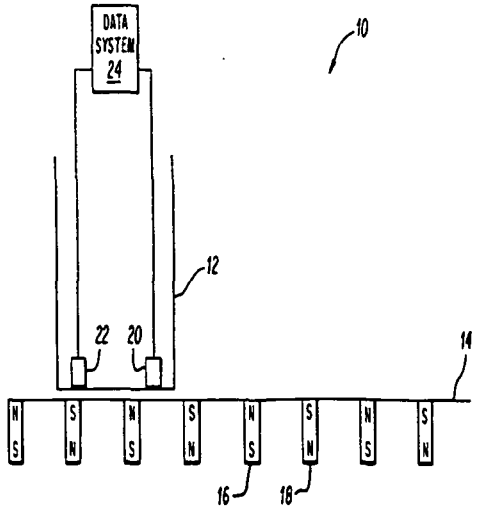
N91-23271*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
STATIC FEED WATER ELECTROLYSIS SUBSYSTEM DEVELOPMENT Patent Application
FRANZ H. SCHUBERT, inventor (to NASA) and DAVID J. GRIGGER, inventor (to NASA) (Life Systems, Inc., Cleveland, OH.) 1 Feb. 1991 13 p
(NASA-CASE-MSC-21577-1-SB; NAS 1.71:MSC-21577-1-SB; US-PATENT-APPL-SN-748933) Avail: NTIS HC/MF A03 CSCL 07D

This disclosure is directed to an electrolysis cell forming hydrogen and oxygen at spaced terminals. The anode terminal is porous and able to form oxygen within the cell and permit escape of the gaseous oxygen through the anode and out through a flow line in the presence of back pressure. Hydrogen is liberated in the cell at the opposing solid metal cathode which is permeable to hydrogen but not oxygen so that the migratory hydrogen formed in the cell is able to escape from the cell. The cell is maintained at an elevated pressure so that oxygen liberated by the cell is delivered at elevated pressure without pumping to raise the pressure of the oxygen.

NASA

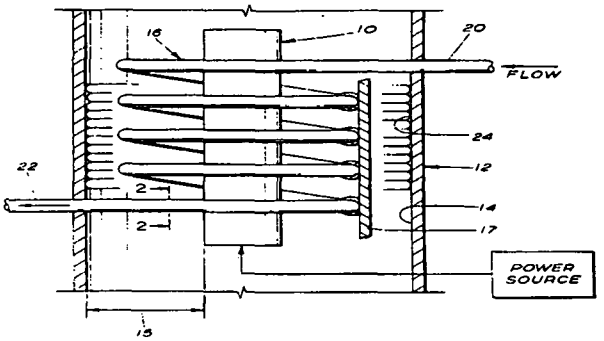


N91-24362*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
PURIFICATION SYSTEM Patent Application
DAVID T. FLANAGAN, inventor (to NASA) and RANDALL E. GIBBONS, inventor (to NASA) (Krug International, Houston, TX.) 8 Jan. 1991 13 p
(NASA-CASE-MSC-21584-1; NAS 1.71:MSC-21584-1; US-PATENT-APPL-SN-638600) Avail: NTIS HC/MF A03 CSCL 07D

A system for prolonging the life of a granulated activated charcoal (GAC) water treatment device is disclosed in which an ultraviolet light transparent material is used to constrain water to

flow over carbon surfaces. It is configured to receive maximum flux from a UV radiation source, for the purpose of preventing microbial proliferation on the carbon surfaces, oxidizing organic contaminants adsorbed from the water onto the carbon surfaces and from biodegradation of adsorbed microbial forms, disinfecting water, and oxidizing organic contaminants in the water.

NASA



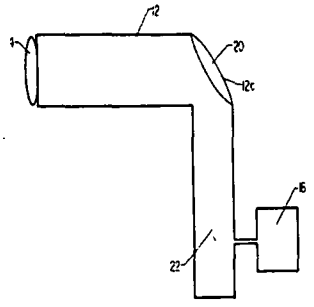
N91-28321*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ACOUSTOPHORESIS METHOD AND APPARATUS Patent Application

JOSEPH S. HEYMAN, inventor (to NASA) 17 Dec. 1990 15 p (NASA-CASE-LAR-13388-1; NAS 1.71:LAR-13388-1; US-PATENT-APPL-SN-628062) Avail: NTIS HC/MF A03 CSCL 07D

A method and apparatus are provided for acoustophoresis, i.e., the separation of species via acoustic waves. An ultrasonic transducer applies an acoustic wave to one end of a sample container containing at least two species having different acoustic absorptions. The wave has a frequency tuned to or harmonized with the point of resonance of the species to be separated. This wave caused the species to be driven to an opposite end of the sample container for removal. A second ultrasonic transducer may be provided to apply a second, oppositely directed acoustic wave to prevent undesired streaming. In addition, a radio frequency tuned to the mechanical resonance and coupled with a magnetic field can serve to identify a species in a medium comprising species with similar absorption coefficients, whereby an acoustic wave having a frequency corresponding to this gyrational rate can then be applied to sweep the identified species to one end of the container for removal.

NASA



N91-31258* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

ETCHING METHOD FOR PHOTORESISTS OR POLYMERS Patent

NARCINDA R. LERNER, inventor (to NASA) and THEODORE J. WYDEVEN, JR., inventor (to NASA) 16 Apr. 1991 13 p Filed 4 May 1989 Continuation-in-part of US-Patent-Appl-SN-150169, filed 29 Jan. 1988 (NASA-CASE-ARC-11873-2; US-PATENT-5,007,983; US-PATENT-APPL-SN-347591; US-PATENT-APPL-SN-150169; US-PATENT-CLASS-156-643; US-PATENT-CLASS-156-668; US-PATENT-CLASS-156-345; US-PATENT-CLASS-437-229; US-PATENT-CLASS-204-192.32; INT-PATENT-CLASS-H01L-21/306) Avail: US Patent and Trademark Office CSCL 07D

A method for etching or removing polymers, photoresists, and organic contaminants from a substrate is disclosed. The method includes creating a more reactive gas species by producing a plasma discharge in a reactive gas such as oxygen and contacting the resulting gas species with a sacrificial solid organic material such as polyethylene or polyvinyl fluoride, reproducing a highly reactive gas species, which in turn etches the starting polymer, organic contaminant, or photoresist. The sample to be etched is located away from the plasma glow discharge region so as to avoid damaging the substrate by exposure to high energy particles and electric fields encountered in that region. Greatly increased etching rates are obtained. This method is highly effective for etching polymers such as polyimides and photoresists that are otherwise difficult or slow to etch downstream from an electric discharge in a reactive gas.

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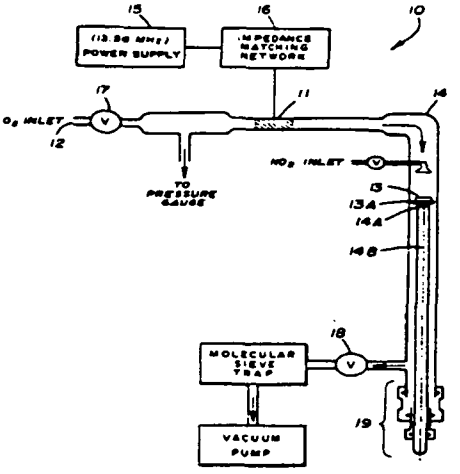

N91-32196* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

IGNITABILITY TEST METHOD AND APPARATUS Patent

LAURENCE J. BEMENT, inventor (to NASA), JAMES W. BAILEY, inventor (to NASA), and MORRY L. SCHIMMEL, inventor (to NASA) 1 Oct. 1991 11 p Filed 4 Oct. 1990 Continuation-in-part of abandoned US-Patent-Appl-SN-426345, filed 30 Nov. 1989 (NASA-CASE-LAR-14454-1; US-PATENT-5,052,817; US-PATENT-APPL-SN-593412; US-PATENT-APPL-SN-426345; US-PATENT-CLASS-374-8; US-PATENT-CLASS-73-167; US-PATENT-CLASS-102-200; INT-PATENT-CLASS-G01N-25/50)

Avail: US Patent and Trademark Office CSCL 21B

An apparatus for testing ignitability of an initiator includes a body having a central cavity, an initiator holder for holding the initiator over the central cavity of the body, an ignition material holder disposed in the central cavity of the body and having a cavity facing the initiator holder which receives a measured quantity of ignition material to be ignited by the initiator. It contains a chamber in communication with the cavity of the ignition material and the central cavity of the body, and a measuring system for analyzing pressure characteristics generated by ignition of the ignition material by the initiator. The measuring system includes at least one transducer coupled with an oscillograph for recording pressure traces generated by ignition.

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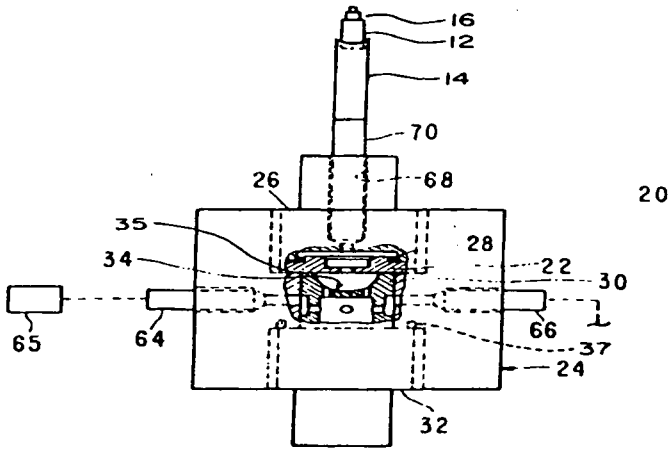


26
METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N91-28363*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

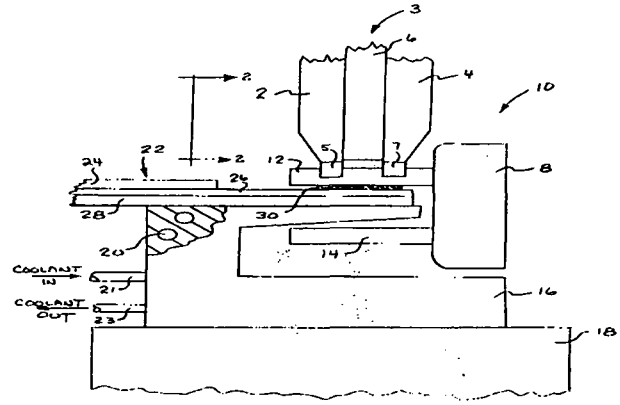
HIGH TEMPERATURE SOLDER DEVICE FOR FLAT CABLES Patent Application

CARL L. HAEHNER, inventor (to NASA) 20 Jun. 1991 16 p

(NASA-CASE-GSC-13344-1; NAS 1.71:GSC-13344-1; US-PATENT-APPL-SN-718046) Avail: NTIS HC/MF A03 CSCL 11F

A high temperature solder device for flat cables includes a microwelder, an anvil which acts as a heat sink and supports a flexible flat ribbon cable that is to be connected to a multiple pin connector. The microwelder is made from a modified commercially available resistance welding machine such as the Split Tip Electrode microwelder by Weltek, which consists of two separate electrode halves with a removable dielectric spacer in between. The microwelder is not used to weld the items together, but to provide a controlled compressive force on, and energy pulse to, a solder preform placed between a pin of the connector and a conductor of the flexible flat ribbon cable. When the microwelder is operated, an electric pulse will flow down on electrode, through the solder preform and back up the other electrode. This pulse of electrical energy will cause the solder preform to heat up and melt, joining the pin and conductor.

NASA



27
NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N91-24426*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

IMPROVED SPRAYABLE LIGHTWEIGHT ABLATIVE COATING Patent Application

WILLIAM G. SIMPSON, inventor (to NASA), MAX H. SHARPE, inventor (to NASA), and WILLIAM E. HILL, inventor (to NASA) 28 Nov. 1990 8 p

(NASA-CASE-MFS-28372-1; NAS 1.71:MFS-28372-1; US-PATENT-APPL-SN-618854) Avail: NTIS HC/MF A02 CSCL 11C

An improved lightweight, ablative coating is disclosed that may be spray applied and cured without the development of appreciable shrinkage cracks. The ablative mixture consists essentially of phenolic microballoons, hollow glass spheres, glass fibers, ground cork, a flexibilized resin binder, and an activated colloidal clay.

NASA

N91-25296* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

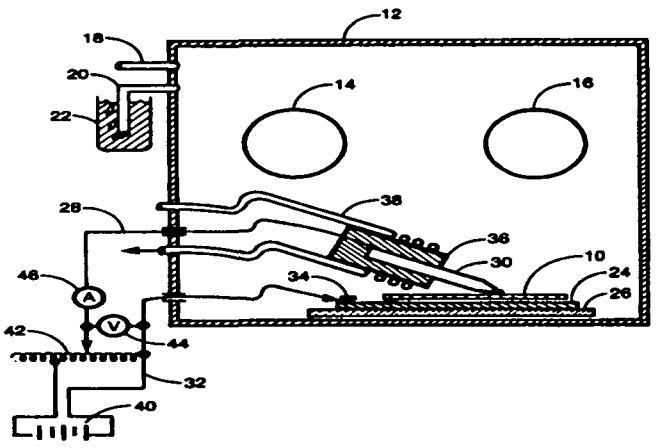
ARC-TEXTURED HIGH EMITTANCE RADIATOR SURFACES Patent

BRUCE A. BANKS, inventor (to NASA) 30 Apr. 1991 6 p Filed 18 Jul. 1989 Supersedes N89-28651 (27 - 23, p 3271) (NASA-CASE-LEW-14679-1; US-PATENT-5,012,062; US-PATENT-APPL-SN-381240; US-PATENT-CLASS-219-69.11; INT-PATENT-CLASS-B23H-9/00) Avail: US Patent and Trademark Office CSCL 11C

High emittance radiator surfaces are produced by arc-texturing. This process produces such a surface on a metal

by scanning it with a low voltage electric arc from a carbon electrode in an inert environment.

Official Gazette of the U.S. Patent and Trademark Office



N91-25298*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

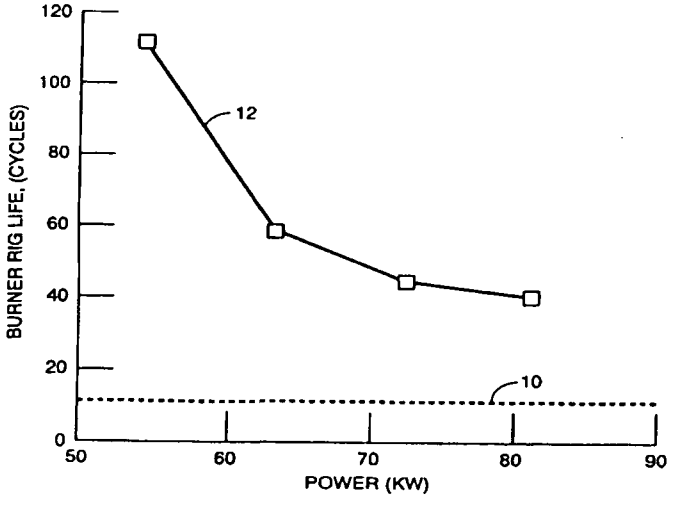
CERAMIC COATINGS ON SMOOTH SURFACES Patent Application

R. A. MILLER, inventor (to NASA), W. J. BRINDLEY, inventor (to NASA), and C. J. ROUGE, inventor (to NASA) 13 May 1991 12 p

(NASA-CASE-LEW-15164-1; NAS 1.71:LEW-15164-1; US-PATENT-APPL-SN-699130) Avail: NTIS HC/MF A03 CSCL 11C

A metallic coating is plasma sprayed onto a smooth surface of a metal alloy substitute or on a bond coating. An initial thin ceramic layer is low pressure sprayed onto the smooth surface of the substrate or bond coating. Another ceramic layer is atmospheric plasma sprayed onto the initial ceramic layer.

NASA



N91-26375*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

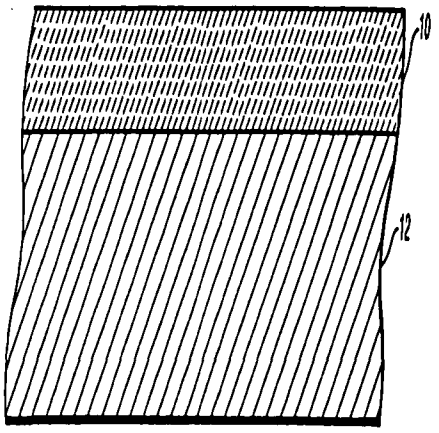
OXIDATION RESISTANT COATINGS FOR TITANIUM ALLOYS AND TITANIUM ALLOY MATRIX COMPOSITES Patent Application

WILLIAM J. BRINDLEY, inventor (to NASA), JAMES L. SMIALEK, inventor (to NASA), and CARL J. ROUGE, inventor (to NASA) 1 Apr. 1991 9 p

(NASA-CASE-LEW-15155-1; NAS 1.71:LEW-15155-1; US-PATENT-APPL-SN-682160) Avail: NTIS HC/MF A02 CSCL 11C

An oxidation resistant coating for titanium alloys and titanium alloy matrix composites comprises an MCrAlX material. M is a metal selected from nickel, cobalt, and iron. X is an active element selected from Y, Yb, Zr, and Hf.

NASA



N91-26376*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

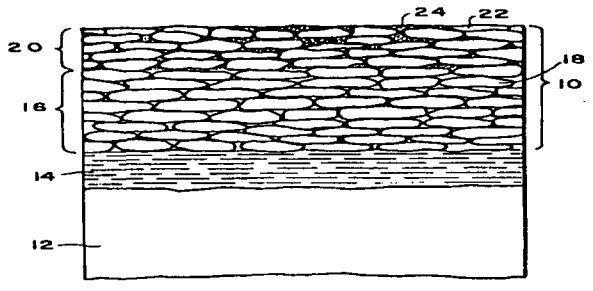
METHOD OF PREPARING A THERMAL BARRIER COATING Patent Application

I. ZAPLATYNSKY, inventor (to NASA) 1 Mar. 1991 10 p

(NASA-CASE-LEW-14999-2; NAS 1.71:LEW-14999-2; US-PATENT-APPL-SN-662684) Avail: NTIS HC/MF A02 CSCL 11C

A composite thermal barrier coating is plasma sprayed onto a substrate. This coating has a first layer including a first ceramic material and a second layer including a second ceramic material impregnated with a glass, the glass being a ternary eutectic. The glass may consist of about 14.6 weight percent Al2O3, about 23.3 weight percent CaO, and about 62.1 weight percent SiO2. The first and second ceramic materials may include yttria-stabilized zirconia.

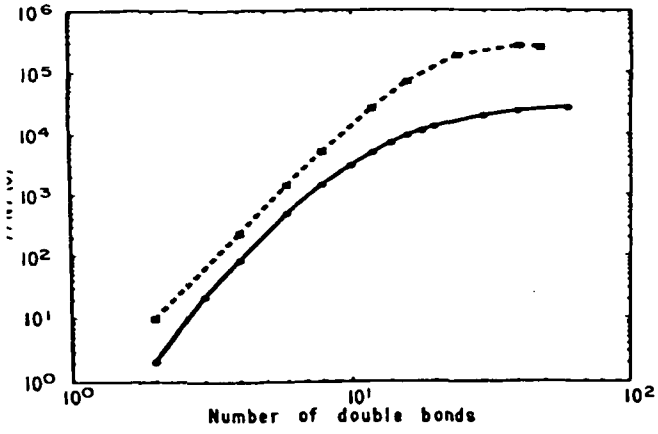
NASA



N91-27372* National Aeronautics and Space Administration. Pasadena Office, CA.
MOLECULES WITH ENHANCED ELECTRONIC POLARIZABILITIES BASED ON DEFECT-LIKE STATES IN CONJUGATED POLYMERS Patent
DAVID N. BERATAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Apr. 1991 22 p Filed 10 Oct. 1989
(Contract NAS7-918)
(NASA-CASE-NPO-17633-1-CU; US-PATENT-5,011,907; US-PATENT-APPL-SN-418611; US-PATENT-CLASS-528-220; US-PATENT-CLASS-528-222; US-PATENT-CLASS-528-225; US-PATENT-CLASS-528-227; US-PATENT-CLASS-528-228; US-PATENT-CLASS-528-230; US-PATENT-CLASS-528-233)
Avail: US Patent and Trademark Office CSCL 11C

Highly conjugated organic polymers typically have large non-resonant electronic susceptibilities, which give the molecules unusual optical properties. To enhance these properties, defects are introduced into the polymer chain. Examples include light doping of the conjugated polymer and synthesis, conjugated polymers which incorporate either electron donating or accepting groups, and conjugated polymers which contain a photoexcitable species capable of reversibly transferring its electron to an acceptor. Such defects in the chain permit enhancement of the second hyperpolarizability by at least an order of magnitude.

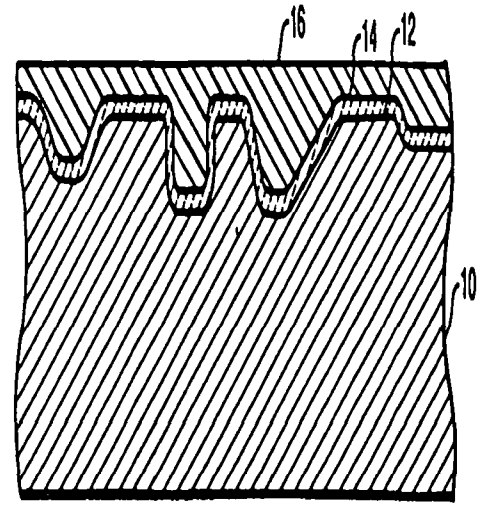
Official Gazette of the U.S. Patent and Trademark Office



N91-28423*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
PRETREATMENT OF LUBRICATED SURFACES WITH SPUTTERED CADMIUM OXIDE Patent Application
ROBERT L. FUSARO, inventor (to NASA) 24 Jun. 1991 12 p
(NASA-CASE-LEW-14474-1; NAS 1.71:LEW-14474-1; US-PATENT-APPL-SN-720133) Avail: NTIS HC/MF A03 CSCL 11C

Cadmium oxide is used with a dry solid lubricant on a surface to improve wear resistance. The surface topography is first altered by photochemical etching to a predetermined pattern. The cadmium oxide is then sputtered onto the altered surface to form an intermediate layer to more tightly hold the dry lubricant, such as graphite.

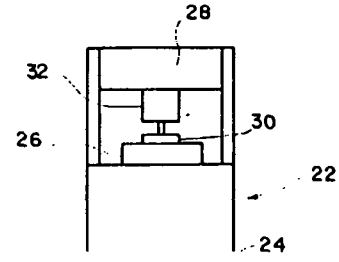
NASA



N91-28424*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
***PROCESS FOR BONDING ELASTOMERS TO METAL* Patent Application**
GEORGE E. DICKERSON, inventor (to NASA) and HENRY L. KELLEY, inventor (to NASA) 26 Jun. 1991 13 p
(NASA-CASE-LAR-13645-1; NAS 1.71:LAR-13645-1; US-PATENT-APPL-SN-721038) Avail: NTIS HC/MF A03 CSCL 11C

A process for bonding elastomeric material to a metal part includes coating a heat curable adhesive on the surfaces of the metal part to be bonded. The metal part is placed in a mold, a bottom plate and an upper transfer pot of a transfer molding machine is preheated to a predetermined cure temperature. A predetermined quantity of uncured elastomeric material is loaded into the transfer pot. The mold containing the adhesive coated metal part is clamped to the bottom plate, and almost contemporaneously, the uncured elastomeric material is pressed into the mold while maintaining heat and pressure in the mold for a time sufficient to vulcanize and thereby cure the elastomeric material simultaneously with the adhesive, whereby contacting surfaces of the metal part are strongly bonded to the vulcanized elastomeric material.

NASA



N91-28425*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
POLYIMIDES PREPARED FROM 3,5-DIAMINO BENZO TRIFLUORIDE Patent Application
MARGARET K. GERBER, inventor (to NASA), J. RICHARD PRATT, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.), TERRY L. ST. CLAIR, inventor (to NASA), and ANNE K. ST. CLAIR, inventor (to NASA) 31 Oct. 1989 13 p
(NASA-CASE-LAR-14206-1; NAS 1.71:LAR-14206-1; US-PATENT-APPL-SN-429574) Avail: NTIS HC/MF A03 CSCL 11C

High performance, thermooxidatively stable polyimides are prepared by reacting aromatic diamines with pendant trifluoromethyl groups and dianhydriges in an amide solvent to form a poly(amic acid), followed by cyclizing the poly(amic acid) to form the corresponding polyimide.

NASA

N91-31307* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
ETHYNYL TERMINATED IMIDOTHIOETHERS AND RESINS THEREFROM Patent
PAUL M. HERGENROTHER, inventor (to NASA), JOHN W. CONNELL, inventor (to NASA), and R. GERALD BASS, inventor (to NASA) (Virginia Commonwealth Univ., Richmond.) 4 Jun. 1991 8 p Filed 4 May 1989 Division of US Patent Appl-SN-218792, filed 14 Jul. 1988
(NASA-CASE-LAR-13910-2-CU; US-PATENT-5,021,518; US-PATENT-APPL-SN-347558; US-PATENT-APPL-SN-218792; US-PATENT-CLASS-525-422; US-PATENT-CLASS-525-471; INT-PATENT-CLASS-C08F-283/04; INT-PATENT-CLASS-C08F-283/00; INT-PATENT-CLASS-C08G-73/10; INT-PATENT-CLASS-C08G-16/00) Avail: US Patent and Trademark Office CSCL 11C

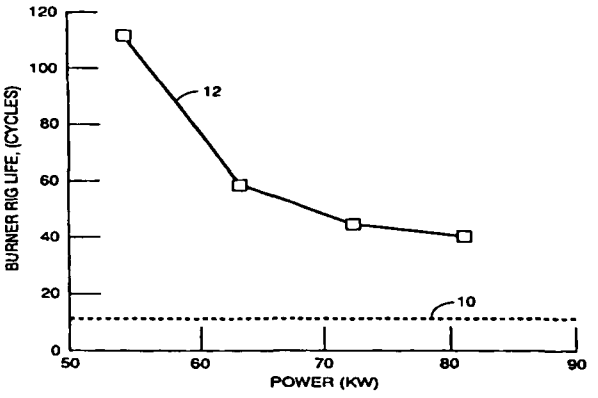
Ethynyl terminated imidothioethers (ETIs) are prepared by the reaction of a dimercaptan, such as 4,4'-dimercaptodiphenyl ether, and an ethynyl containing maleimide, such as N-(3-ethynylphenyl)maleimide. Blends of these ETIs and ethynyl terminated polymeric materials, such as ethynyl terminated sulfones and ethynyl terminated arylene ethers, are also prepared. These resin blends exhibit excellent processability, and the cured blends show excellent fracture toughness and solvent resistance, as well as excellent adhesive and composite properties.

Official Gazette of the U.S. Patent and Trademark Office

N91-32229*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
CERAMIC COATINGS ON SMOOTH SURFACES Patent Application
R. A. MILLER, inventor (to NASA), W. J. BRINDLEY, inventor (to NASA), and C. J. ROUGE, inventor (to NASA) 26 Sep. 1991 11 p
(NASA-CASE-LEW-15164-2; NAS 1.71:LEW-15164-2; US-PATENT-APPL-SN-766591) Avail: NTIS HC/MF A03 CSCL 11C

A metal substrate or a bond coating having a smooth surface is covered by a thin ceramic layer of ZrO2 - 8 pct. Y2O3 having a thickness between 0.6 and 1.9 mils. A second ceramic layer of ZrO2 - 8 pct. Y2O3 having a thickness between about four and 15 mils covers the thin ceramic layer.

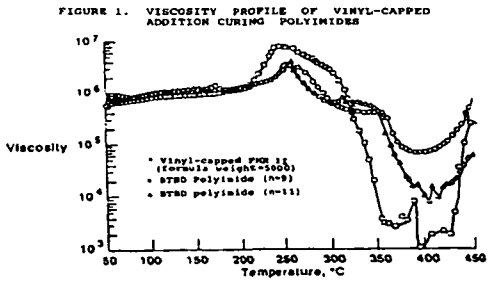
NASA



N91-32230*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
ADDITION POLYIMIDES WITH ENHANCED PROCESSABILITY Patent Application
CHUN-HUA CHUANG, inventor (to NASA) and RAYMOND D. VANNUCCI, inventor (to NASA) 7 Oct. 1991 18 p
(NASA-CASE-LEW-15043-1; NAS 1.71:LEW-15043-1; US-PATENT-APPL-SN-772181) Avail: NTIS HC/MF A03 CSCL 11C

The present invention is directed to nonplanar polyimides having improved thermo-oxidative stability and enhanced processability. In a preferred embodiment, high molecular weight polyimides (HMW PMRs (polymerization of monomer reactants)) are obtained by reacting a nonplanar polyphenyl diamine, a diester or dianhydride of a tetracarboxylic acid, and an end capping compound. A second embodiment involves reacting a diamine with a nonplanar diester, or nonplanar dianhydride, of a tetracarboxylicacid, and an end capping compound. The polyimides of this invention overcome processing difficulties involved with using HMW PMRs through their noncoplanar conformation. For example, the noncoplanare conformation helps reduce the melting temperature and melt viscosity normally required and thereby permits substantially increased resin flow in processing of HMW PMRs. The polyimides of the invention possess excellent thermo-oxidative stability at 343 to 371 C for composite applications. In addition, the polyimides of the invention display a low thermal expansion coefficient and a narrow molecular weight distribution at high molecular weights.

NASA



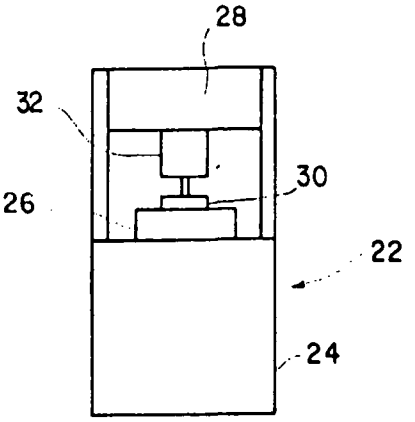
28
PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels.

N91-28444*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
IMPROVING THE PERFORMANCE OF BLASTING CAPS Patent Application
LAURENCE J. BEMENT, inventor (to NASA), RONNIE B. PERRY, inventor (to NASA), and MORRY L. SCHIMMEL, inventor (to NASA) (Schimmel Co., Saint Louis, MO.) 5 Apr. 1991 10 p
(NASA-CASE-LAR-13832-1; NAS 1.71:LAR-13832-1; US-PATENT-APPL-SN-682151) Avail: NTIS HC/MF A02 CSCL 19A

Common blasting caps are made from an aluminum shell in the form of a tube which is closed at both ends. One end, which is called the output end, terminates in a principal side or face, and contains a detonating agent which communicates with a means for igniting the detonating agent. The improvement of the present invention is a flat, steel foil bonded to the face in a position which is aligned perpendicularly to the longitudinal axis of the tube.

NASA



31
ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

N91-25305* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
DUAL DIAPHRAGM TANK WITH TELLTALE DRAIN Patent
WALLACE C. TUTHILL, JR., inventor (to NASA) 2 Jul. 1991 8 p Filed 25 Oct. 1990 Supersedes N91-13580 (29 - 5, p 645)
(NASA-CASE-MSC-21703-1; US-PATENT-5,027,860; US-PATENT-APPL-SN-603052; US-PATENT-CLASS-138-30; US-PATENT-CLASS-138-26; INT-PATENT-CLASS-F16L-55/04) Avail: US Patent and Trademark Office CSCL 13B

A fluid storage and expulsion system comprising a tank with an internal flexible diaphragm assembly of dual diaphragms in back-to-back relationship, at least one of which is provided with a patterned surface having fine edges such that the diaphragms are in contact along said edges without mating contact of surface areas to thereby form fluid channels which extend outwardly to the peripheral edges of the diaphragms is described. The interior wall of the tank at the juncture of tank sections is formed with a circumferential annular recess comprising an outer annular recess portion which forms a fluid collection chamber and an inner annular recess portion which accommodates the peripheral edge portions of the diaphragms and a sealing ring in clamped sealing relation therebetween. The sealing ring is perforated with radially extending passages which allow any fluid leaking or diffusing past a diaphragm to flow through the fluid channels between the diaphragms to the fluid collection chamber. Ports connectable to pressure fittings are provided in the tank sections for admission of fluids to opposite sides of the diaphragm assembly. A drain passage through the tank wall to the fluid collection chamber permits detection, analysis and removal of fluids in the collection chamber.

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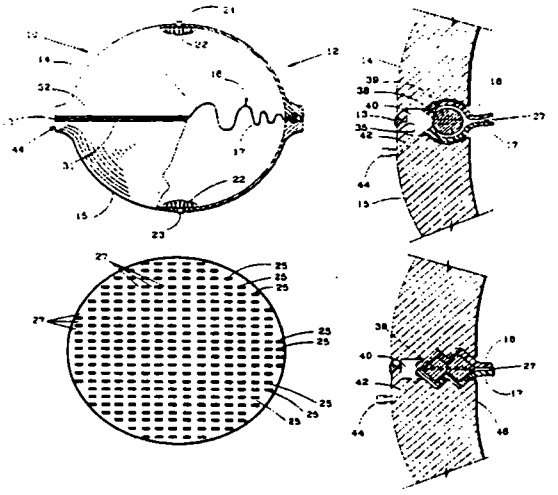
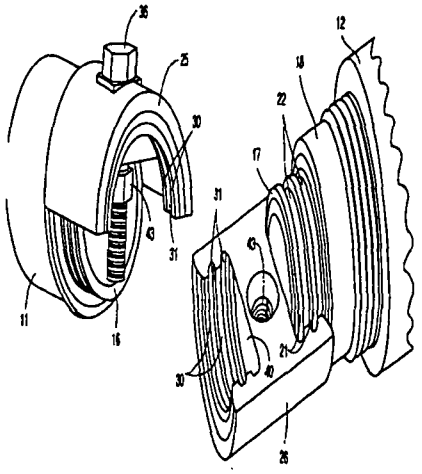


N91-25306*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
APPARATUS FOR JOINING TRUSSES Patent Application
JEFFREY FINCKENOR, inventor (to NASA) 25 Mar. 1991 11 p
(NASA-CASE-MFS-28545-1; NAS 1.71:MFS-28545-1; US-PATENT-APPL-SN-674636) Avail: NTIS HC/MF A03 CSCL 13B

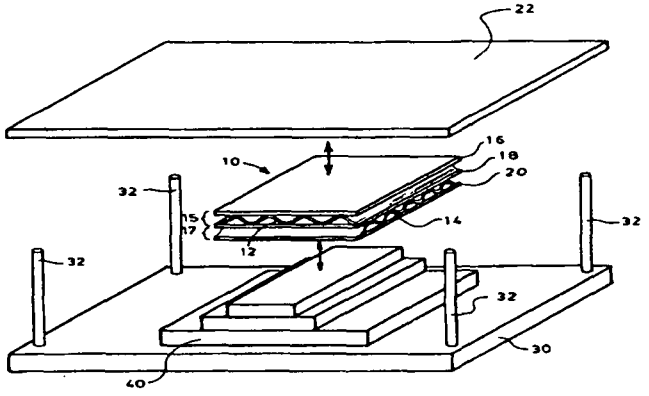
This invention relates to a joint for holding a pair of trusses together in axial alignment. The joint includes a pair of cylindrical locking elements secured to the ends of the trusses. The locking elements each having a plurality of lands and grooves which lie in parallel planes when the trusses are in axial alignment. A pair of clamps positioned on opposite sides of the trusses are provided with a plurality of lands and grooves which mesh with the lands and grooves on the locking elements, with means being provided for urging the clamps toward each other to bring the

trusses into axial alignment and hold them in that position.
NASA



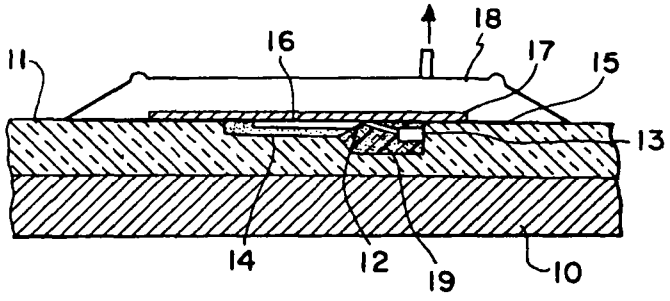
N91-27385* National Aeronautics and Space Administration. Pasadena Office, CA.
FLEXIBLE THERMAL APPARATUS FOR MOUNTING OF THERMOELECTRIC COOLER Patent
JACK A. JONES, inventor (to NASA), S. WALTER PETRICK, inventor (to NASA), and STEVEN BARD, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 16 Jul. 1991 10 p Filed 31 Jul. 1990
(Contract NAS7-918)
(NASA-CASE-NPO-17806-1-CU; US-PATENT-5,031,689; US-PATENT-APPL-SN-560908; US-PATENT-CLASS-165-1; US-PATENT-CLASS-165-185; US-PATENT-CLASS-136-204; INT-PATENT-CLASS-F28F-7/00) Avail: US Patent and Trademark Office CSCL 13B

A flexible heat transfer apparatus used to flexibly connect and thermally couple a thermoelectric cooler to an object to be cooled is disclosed. The flexible heat transfer apparatus consists of a pair of flexible corrugated sheets made from high thermal conductivity materials such as copper, aluminum, gold, or silver. The ridges of the corrugated sheets are oriented perpendicular to one another and bonded sandwich-fashion between three plates to define an upper section and a lower section. The upper section provides X flexure, the lower section provides Y flexure, and both sections together provide Z flexure.
Official Gazette of the U.S. Patent and Trademark Office



N91-28454*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
FLUSH MOUNTING OF THIN FILM SENSORS Patent Application
THOMAS C. MOORE, SR., inventor (to NASA) 6 May 1991 10 p
(NASA-CASE-LAR-14446-1; NAS 1.71:LAR-14446-1; US-PATENT-APPL-SN-699288) Avail: NTIS HC/MF A02 CSCL 13H

Flush mounting of a sensor on a surface is provided by first forming a recessed area on the surface. Next an adhesive bonding mixture is introduced into the recessed area. The adhesive bonding mixture is chosen to provide thermal expansion matching with the surface surrounding the recessed area. A strip of high performance polymeric tape is provided, with the sensor attached to the underside thereof, and the tape is positioned over the recessed area so that it acts as a carrier of the sensor. A shim having flexibility so that it will conform to the surface surrounding the recessed area is placed over the tape, and a vacuum pad is placed over the shim. The area above the surface is then evacuated while holding the sensor flush with the surface during curing of the adhesive bonding mixture. After such curing, the pad, shim, and tape are removed from the sensor, electrical connections for the sensor are provided, after which the remaining space in the recessed area is filled with a polymeric foam.
NASA

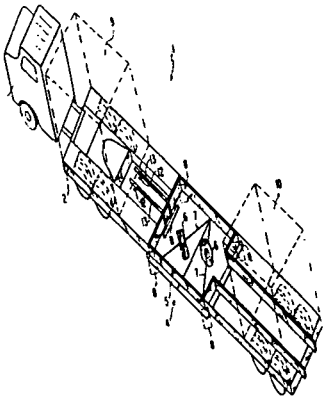


N91-28455*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR CLEANING RUBBER DEPOSITS FROM AIRPORT RUNWAYS AND ROADWAYS Patent Application
SANDY M. STUBBS, inventor (to NASA) 3 Apr. 1991 11 p
(NASA-CASE-LAR-14483-1; NAS 1.71:LAR-14483-1; US-PATENT-APPL-SN-682153) Avail: NTIS HC/MF A03 CSCL 13H

A method and apparatus for cleaning rubber deposits from surfaces such as airport runways and roadways is disclosed. The apparatus includes a large vehicle that has the capacity to be loaded so as to effectively add weight to rubber cleaning tires of the vehicle. In addition, the vehicle has a water tank and sprinkler system so that the surface may be wetted down in front of the tires as the vehicle proceeds across the surface. The cleaning tires of the apparatus are aligned so that they are at a yaw angle to the direction of travel, and the cleaning tire assembly is attached to the underside of the trailer of the vehicle and positioned between a forward and rear water tank. In addition, this tire assembly is

equipped with a means of loading the tires onto the contaminated surface. The method comprises driving such a vehicle at low speeds down the surface as the road is being wet in front of the cleaning tires. The effect of the angled tires is to create a scrubbing action that not only heats the rubber deposits by friction but also causes it to be removed from the surface. The rubber that does not stick to the cleaning tires is then removed from the surface by sweeping.

NASA



N91-31476* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

APPARATUS AND METHOD FOR EXPLOSIVE BONDING TO EDGE OF FLYER PLATE Patent

LAURENCE J. BEMENT, inventor (to NASA) and ANNE C. KUSHNICK, inventor (to NASA) 24 Sep. 1991 11 p Filed 2 Oct. 1990

(NASA-CASE-LAR-14096-1; US-PATENT-5,050,789; US-PATENT-APPL-SN-591644; US-PATENT-CLASS-228-107; US-PATENT-CLASS-228-2.5; INT-PATENT-CLASS-B23K-20/08) Avail: US Patent and Trademark Office CSCL 13H

The invention is an apparatus and a process for the explosive joining of a flyer plate and a base plate. The apparatus consists of a flyer plate positioned over a base plate. The flyer plate has a notch containing a filler material in intimate contact with the flyer plate. An adhesive means holds a ribbon explosive partially overlapping the notch in the flyer plate. A detonating means initiates the ribbon explosive that drives the flyer plate to accomplish a high velocity, angular collision between the mating surfaces. This collision creates surface melts and effacing bonding, resulting in electron sharing linkups between the plates. An unbonded tab fractures at a base of the notch leaving a bond to an edge of the attached flyer plate.

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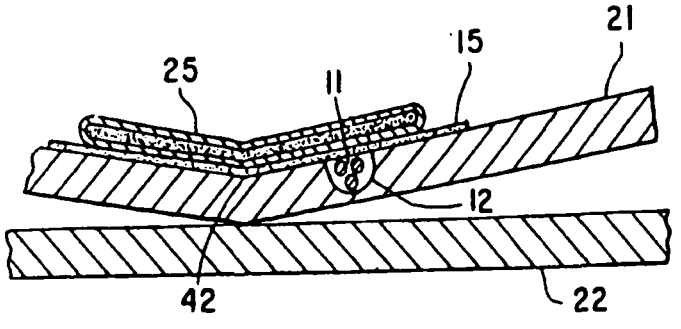


N91-32240* National Aeronautics and Space Administration. Pasadena Office, CA.

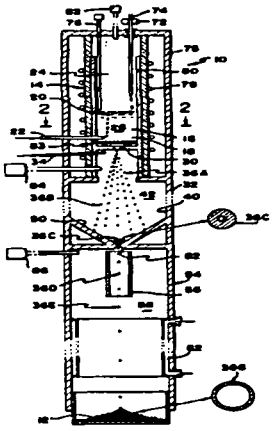
METHOD AND APPARATUS FOR PRODUCING MICROSHELLS Patent

MARK C. LEE, inventor (to NASA), CHRISTOPHER H. SCHILLING, inventor (to NASA), and TAYLOR G. WANG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 8 Oct. 1991 7 p Filed 30 Apr. 1986

(NASA-CASE-NPO-16635-1-CU; US-PATENT-5,055,240; US-PATENT-APPL-SN-858054; US-PATENT-CLASS-264-5; US-PATENT-CLASS-65-21.4; US-PATENT-CLASS-75-331; US-PATENT-CLASS-75-338; US-PATENT-CLASS-75-340; US-PATENT-CLASS-75-342; US-PATENT-CLASS-264-12) Avail: US Patent and Trademark Office CSCL 13H

A method is described for forming hollow particles, or shells, of extremely small size. The shell material is heated to a molten temperature in the presence of a gas that is at least moderately soluble in the shell material, to form a solution of the molten shell material and the soluble gas. The solution is atomized to form a multiplicity of separate droplets that are cooled while in free fall. Cooling of a droplet from the outside traps the desolved gas and forces it to form a gas bubble at the center of the droplet which now forms a gas filled shell. The shell is reheated and then cooled in free fall, in an environment having a lower pressure than the gas pressure in the shell. This causes expansion of the shell and the formation of a shell having a small wall thickness compared to its diameter.

Official Gazette of the U.S. Patent and Trademark Office



32

COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

N91-25316* National Aeronautics and Space Administration. Pasadena Office, CA.

DOPPLER-CORRECTED DIFFERENTIAL DETECTION SYSTEM Patent

MARVIN K. SIMON, inventor (to NASA) and DARIUSH DIVSALAR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Apr. 1991 27 p Filed 7 Jun. 1988 Supersedes N88-30001 (26 - 24, p 3359)

(Contract NAS7-918)

(NASA-CASE-NPO-16987-1-CU; US-PATENT-5,007,068; US-PATENT-APPL-SN-203374; US-PATENT-CLASS-375-53; US-PATENT-CLASS-375-56; US-PATENT-CLASS-375-85; US-PATENT-CLASS-375-97; INT-PATENT-CLASS-H04B-1/10)

Avail: US Patent and Trademark Office CSCL 17B

Doppler in a communication system operating with a multiple differential phase-shift-keyed format (MDPSK) creates an adverse phase shift in an incoming signal. An open loop frequency estimation is derived from a Doppler-contaminated incoming signal. Based upon the recognition that, whereas the change in phase of the received signal over a full symbol contains both the differentially encoded data and the Doppler induced phase shift, the same change in phase over half a symbol (within a given symbol interval) contains only the Doppler induced phase shift, and the Doppler effect can be estimated and removed from the incoming signal. Doppler correction occurs prior to the receiver's final output of decoded data. A multiphase system can operate with two samplings per symbol interval at no penalty in signal-to-noise ratio provided that an ideal low pass pre-detection filter is employed, and two samples, at 1/4 and 3/4 of the symbol interval T sub s, are taken and summed together prior to incoming signal data detection.

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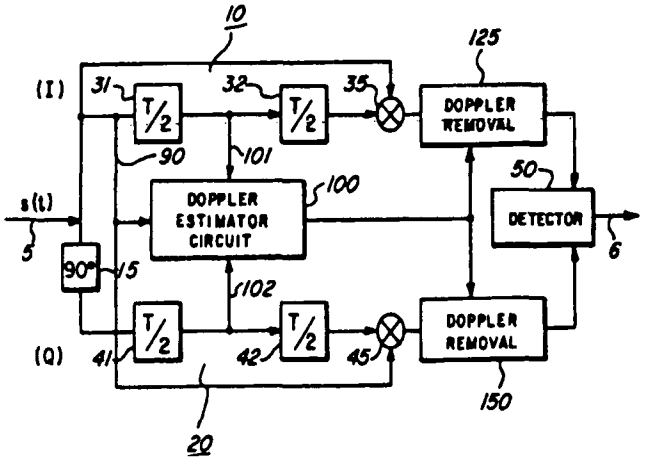

N91-25317* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

METHOD AND APPARATUS FOR SENSOR FUSION Patent

KUMAR KRISHEN, inventor (to NASA), SCOTT SHAW, inventor (to NASA), and RUI J. P. DEFIGUEIREDO, inventor (to NASA) 2 Apr. 1991 24 p Filed 30 Dec. 1988 Supersedes N89-25360 (27 - 19, p 2703)

(NASA-CASE-MSC-21334-1; US-PATENT-5,005,147; US-PATENT-APPL-SN-292130; US-PATENT-CLASS-364-578; INT-PATENT-CLASS-G06F-15/20) Avail: US Patent and Trademark Office CSCL 17I

Method and apparatus for fusion of data from optical and radar sensors by error minimization procedure is presented. The method was applied to the problem of shape reconstruction of an unknown surface at a distance. The method involves deriving an incomplete surface model from an optical sensor. The unknown characteristics of the surface are represented by some parameter. The correct value of the parameter is computed by iteratively generating theoretical predictions of the radar cross sections (RCS) of the surface, comparing the predicted and the observed values for the RCS, and improving the surface model from results of the comparison. Theoretical RCS may be computed from the surface model in several ways. One RCS prediction technique is the method of moments. The method of moments can be applied to an unknown surface only if some shape information is available from an independent source. The optical image provides the independent information.

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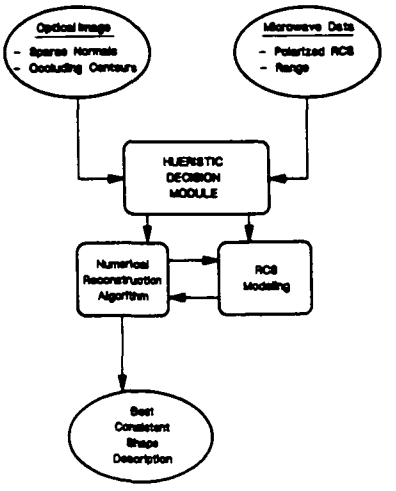


N91-25318* National Aeronautics and Space Administration. Pasadena Office, CA.

PHASE AMBIGUITY RESOLUTION FOR OFFSET QPSK MODULATION SYSTEMS Patent

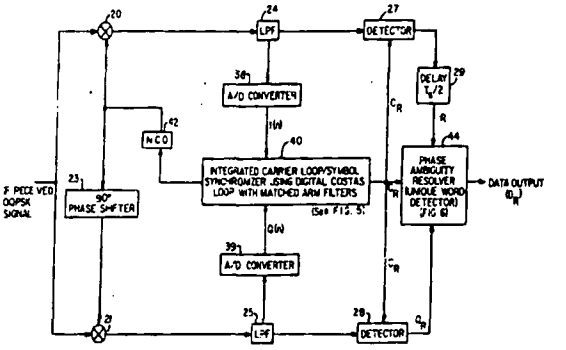
TIEN M. NGUYEN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 18 Jun. 1991 18 p Filed 30 Nov. 1989 Supersedes N90-16975 (28 - 9, p 1204)

(Contract NAS7-918)

(NASA-CASE-NPO-17853-1-CU; US-PATENT-5,025,455; US-PATENT-APPL-SN-443539; US-PATENT-CLASS-375-53; US-PATENT-CLASS-375-86; US-PATENT-CLASS-329-304; INT-PATENT-CLASS-H04L-27/18) Avail: US Patent and Trademark Office CSCL 17B

A demodulator for Offset Quaternary Phase Shift Keyed (OQPSK) signals modulated with two words resolves eight possible combinations of phase ambiguity which may produce data error by first processing received I(sub R) and Q(sub R) data in an integrated carrier loop/symbol synchronizer using a digital Costas loop with matched filters for correcting four of eight possible phase lock errors, and then the remaining four using a phase ambiguity resolver which detects the words to not only reverse the received I(sub R) and Q(sub R) data channels, but to also invert (complement) the I(sub R) and/or Q(sub R) data, or to at least complement the I(sub R) and Q(sub R) data for systems using nontransparent codes that do not have rotation direction ambiguity.

Official Gazette of the U.S. Patent and Trademark Office



N91-27439* National Aeronautics and Space Administration. Pasadena Office, CA.
MULTIPLE SYMBOL DIFFERENTIAL DETECTION Patent
DARIUSH DIVSALAR, inventor (to NASA) and MARVIN K. SIMON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 21 May 1991 24 p Filed 31 Jul. 1990
(Contract NAS7-918)
(NASA-CASE-NPO-17896-1-CU; US-PATENT-5,017,883; US-PATENT-APPL-SN-560691; US-PATENT-CLASS-329-304; US-PATENT-CLASS-375-53; US-PATENT-CLASS-375-56; US-PATENT-CLASS-375-85; US-PATENT-CLASS-375-86; INT-PATENT-CLASS-H04L-27/22) Avail: US Patent and Trademark Office CSCL 17B

A differential detection technique for multiple phase shift keying (MPSK) signals is provided which uses a multiple symbol observation interval on the basis of which a joint decision is made regarding the phase of the received symbols. In accordance with the invention, a first difference phase is created between first and second received symbols. Next, the first difference phase is correlated with the possible values thereof to provide a first plurality of intermediate output signals. A second difference phase is next created between second and third received symbols. The second difference phase is correlated with plural possible values thereof to provide a second plurality of intermediate output signals .Next, a third difference phase is created between the first and third symbols. The third difference phase is correlated with plural possible values thereof to provide a third plurality of intermediate output signals. Each of the first plurality of intermediate outputs are combined with each of the second plurality of intermediate outputs and each of the third plurality of intermediate outputs to provide a plurality of possible output values. Finally, a joint decision is made by choosing from the plurality of possible output values the value which represents the best combined correlation of the first, second and third difference values with the possible values thereof.

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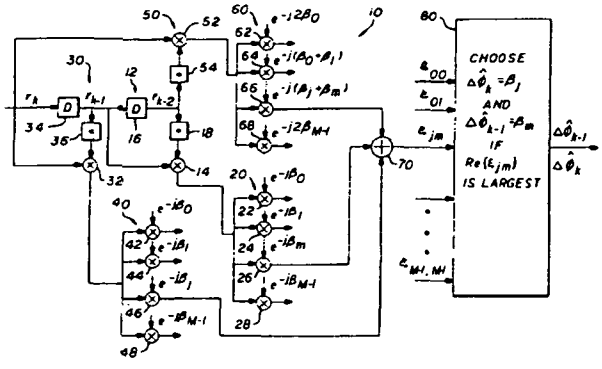

33
ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

N91-21434* National Aeronautics and Space Administration. Pasadena Office, CA.
LATERALLY STACKED SCHOTTKY DIODES FOR INFRARED SENSOR APPLICATIONS Patent
TRUE-LON LIN, inventor (to NASA) (Jet Propulsion Lab., California Inst.of Tech., Pasadena.) 5 Feb 1991 5 p Filed 9 Jun. 1989 Supersedes N90-10329 (28 - 1, p 58)
(Contract NAS7-918)
(NASA-CASE-NPO-17426-1-CU; US-PATENT-4,990,988; US-PATENT-APPL-SN-363815; US-PATENT-CLASS-357-30; US-PATENT-CLASS-357-15; US-PATENT-CLASS-357-67S; US-PATENT-CLASS-357-71S; INT-PATENT-CLASS-H01L-27/14) Avail: US Patent and Trademark Office CSCL 09A

Laterally stacked Schottky diodes for infrared sensor applications are fabricated utilizing porous silicon having pores. A Schottky metal contract is formed in the pores, such as by electroplating. The sensors may be integrated with silicon circuits on the same chip with a high quantum efficiency, which is ideal for IR focal plane array applications due to uniformity and reproducibility.

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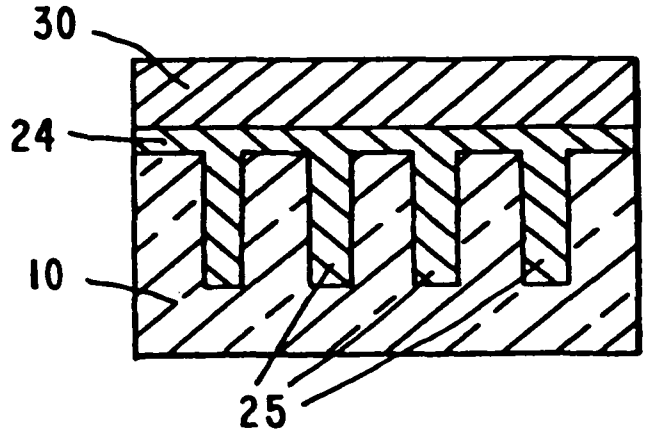
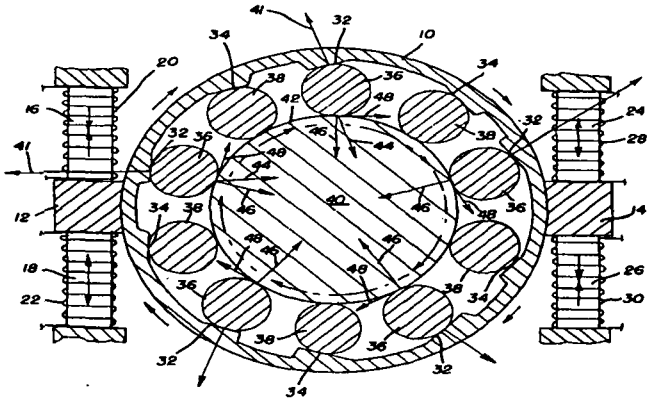


N91-23380*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
MAGNETOSTRICTIVE ROLLER DRIVE MOTOR Patent Application
JOHN M. VRANISH, inventor (to NASA) 10 Jan. 1991 17 p
(NASA-CASE-GSC-13369-1; NAS 1.71:GSC-13369-1; US-PATENT-APPL-SN-645972) Avail: NTIS HC/MF A03 CSCL 09A

A magnetostrictive drive motor is disclosed which has a rotary drive shaft in the form of a drum which is encircled by a plurality of substantially equally spaced roller members in the form of two sets of cones which are in contact with the respective cam surfaces on the inside surface of an outer drive ring. The drive ring is attached to sets of opposing pairs of magnetostrictive rods. Each rod in a pair is mutually positioned end to end within respective energizing coils. When one of the coils in an opposing pair is energized, the energized rod expands while the other rod is caused to contract, causing the drive ring to rock, i.e., rotate slightly in either the clockwise or counterclockwise direction, depending upon which rod in a pair is energized. As the drive ring is activated in repetitive cycles in either direction, one set of drive cones attempts to roll up their respective cam surface but are pinned between the drive shaft drum and the drive ring. As the frictional force preventing sliding builds up, the cones become locked, setting up reaction forces including a tangential component which is imparted to the drive shaft drum to provide a source of motor torque. Simultaneously the other set of cones are disengaged from the drive shaft drum. Upon deactivation of the magnetostrictive

rod coils, the force on the drive cones is released, causing the system to return to an initial rest position. By repetitively cycling the energization of the magnetostrictive rods, the drive shaft drum indexes in microradian rotational steps.

NASA



N91-25335*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

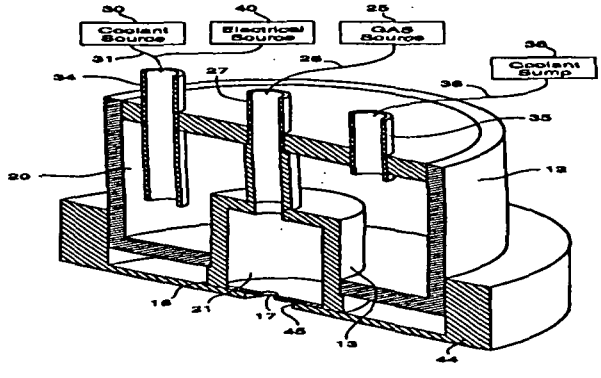
ARC/GAS ELECTRODE Patent Application

RICHARD M. POORMAN, inventor (to NASA) and JACK L. WEEKS, inventor (to NASA) (Rockwell International Corp., Canoga Park, CA.) 27 Mar. 1991 11 p

(NASA-CASE-MFS-29766-1; NAS 1.71:MFS-29766-1; US-PATENT-APPL-SN-677182) Avail: NTIS HC/MF A03 CSCL 09A

A gas/arc electrode is disclosed for use under vacuum conditions where a first housing encloses a second housing, with an end of the second housing extending through an opening in the first housing and having an outlet orifice. Provisions are made for circulating a coolant through the first housing to surround and cool the second housing. An electrical current and a gas, such as argon, as passed through the second housing, with the current flowing through a narrow stream of the ionized gas flowing through the outlet orifice to a workpiece to be treated. The second housing forms a chamber which has a cross sectional area, in a plane perpendicular to the direction of gas flow, of at least ten times the cross sectional area of the outlet orifice such that a gas pressure can be maintained in the chamber to reduce erosion of the chamber walls.

NASA



N91-26438* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

SYNCHRONOUS DEMODULATOR Patent

JOHN F. SUTTON, inventor (to NASA) 14 May 1991

8 p Filed 29 Sep. 1989

(NASA-CASE-GSC-13179-1; US-PATENT-5,015,963; US-PATENT-APPL-SN-414815; US-PATENT-CLASS-329-361; US-PATENT-CLASS-329-349; US-PATENT-CLASS-307-353; INT-PATENT-CLASS-H03D-1/04) Avail: US Patent and Trademark Office CSCL 09C

A synchronous demodulator includes a switch which is operated in synchronism with an incoming periodic signal and both divides and applies that signal to two signal channels. The two channels each include a network for computing and holding, for a predetermined length of time, the average signal value on that channel and applies those valves, in the form of two other signals, to the inputs of a differential amplifier. The networks may be R-C networks. The output of the differential amplifier may or may not form the output of the synchronous detector and may or may not be filtered. The output will not include a periodic signal due to the presence of a dc offset. Additionally, the output will not contain any substantial ripple due to periodic components in the input signal. In a somewhat more complex version, containing twice the structural components of the above synchronous demodulator with a more complex switching mechanism, essentially all ripple due to periodic components in the input signal are eliminated.

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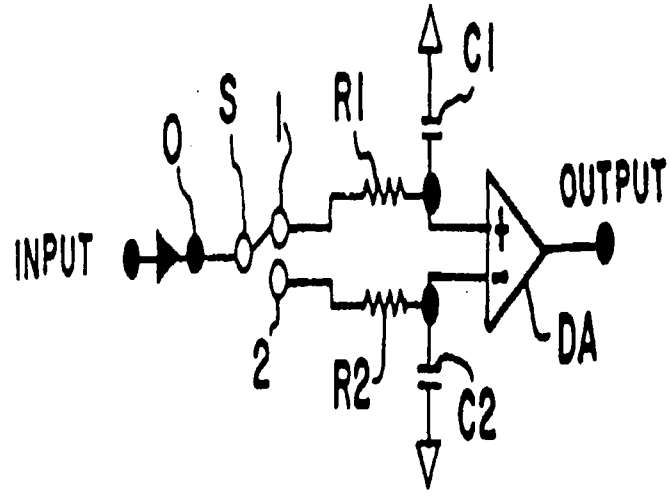


N91-26459*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

CONTROL CIRCUITRY USING ELECTRONIC EMULATION OF A SYNCHRO SIGNAL FOR ACCURATE CONTROL OF POSITION AND RATE OF ROTATION FOR SHAFTS Patent Application

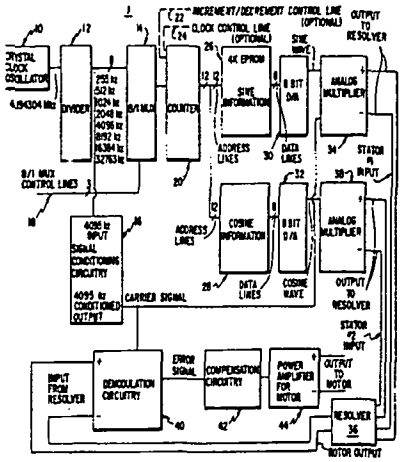
DAVID E. HOWARD, inventor (to NASA) and DENNIS A. SMITH, inventor (to NASA) 3 Jun. 1991 16 p

(NASA-CASE-MFS-28458-1; NAS 1.71:MFS-28458-1; US-PATENT-APPL-SN-710192) Avail: NTIS HC/MF A03 CSCL 09A

The invention disclosed is a digital circuit which emulates a synchro signal in a synchro-resolver follower system for precise control of shaft position and rotation at very low rotational rates. The invention replaces the synchro and drive motor in a synchro-resolver follower system with a digital and analog synchro

emulation circuit for generating the resolver control signal. The synchro emulation circuit includes amplitude modulation means to provide relatively high frequency resolver excitation signals for accurate resolver response even with very low shaft rotation rates.

NASA



N91-27478* National Aeronautics and Space Administration. Pasadena Office, CA.

METAL CHLORIDE CATHODE FOR A BATTERY Patent

RATNAKUMAR V. BUGGA, inventor (to NASA), SALVADOR DISTEFANO, inventor (to NASA), and C. PERRY BANKSTON, *inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech.,* Pasadena.) 28 May 1991 10 p Filed 30 Mar. 1990

(Contract NAS7-918)

(NASA-CASE-NPO-17809-1-CU; US-PATENT-5,019,470; US-PATENT-APPL-SN-503409; US-PATENT-CLASS-429-223; US-PATENT-CLASS-29-623.5; INT-PATENT-CLASS-H01M-4/58; INT-PATENT-CLASS-H01M-4/04) Avail: US Patent and Trademark Office CSCL 10C

A method of fabricating a rechargeable battery is disclosed which includes a positive electrode which contains a chloride of a selected metal when the electrode is in its active state. The improvement comprises fabricating the positive electrode by: providing a porous matrix composed of a metal; providing a solution of the chloride of the selected metal; and impregnating the matrix with the chloride from the solution.

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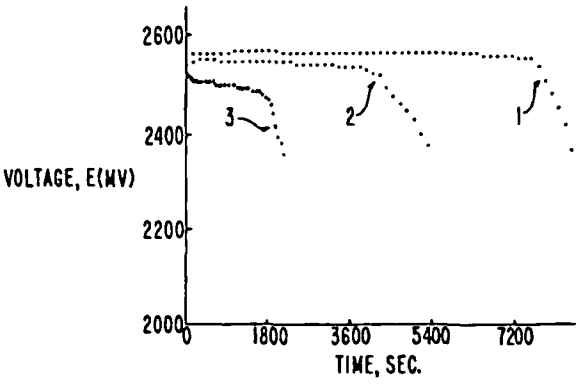

N91-27479* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

DIFFERENTIAL CURRENT SOURCE Patent

JOHN F. SUTTON, inventor (to NASA) 4 Jun. 1991 7 p Filed 6 Oct. 1989

(NASA-CASE-GSC-13280-1; US-PATENT-5,021,729; US-PATENT-APPL-SN-418373; US-PATENT-CLASS-323-311; US-PATENT-CLASS-323-312; INT-PATENT-CLASS-G05F-1/12) Avail: US Patent and Trademark Office CSCL 09C

A differential, voltage-controlled current source, employing operational amplifiers as the active elements, provides an essentially symmetrical, differential, high impedance drive to a load, the drive being isolated from any circuit common or system ground. Because of the floating differential drive and the identical source impedances of the two outputs, errors from common mode voltage are eliminated.

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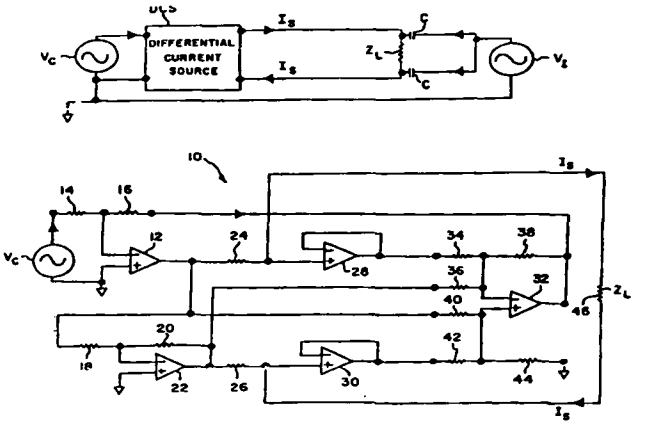


N91-28490*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

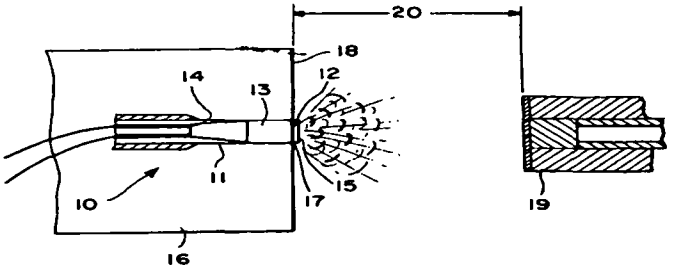
METHOD OF PREFORMING AND ASSEMBLING SUPERCONDUCTING CIRCUIT ELEMENTS Patent Application

GENE H. HAERTLING, inventer (to NASA) (Clemson Univ., SC.) and JOHN D. BUCKLEY, inventer (to NASA) 6 Mar. 1991 17 p

(NASA-CASE-LAR-14395-1-CU; NAS 1.71:LAR-14395-1-CU; US-PATENT-APPL-SN-666536) Avail: NTIS HC/MF A03 CSCL 09A

The invention is a method of preforming and pretesting rigid and discrete superconductor circuit elements to optimize the superconductivity development of the preformed circuit element prior to its assembly, and encapsulation on a substrate and final environmental testing of the assembled ceramic superconductive elements.

NASA



N91-31528* National Aeronautics and Space Administration. Pasadena Office, CA.

A UNIVERSAL COMPUTER CONTROL SYSTEM FOR MOTORS Patent

ZOLTAN F. SZAKALY, inventor (to NASA) 10 Sep. 1991 17 p Filed 23 Mar. 1988 Supersedes N88-24864 (26 - 18, p 2506)

(NASA-CASE-NPO-17134-1-CU; US-PATENT-5,047,700; US-PATENT-APPL-SN-172105; US-PATENT-CLASS-318-568.1; US-PATENT-CLASS-318-568.2; US-PATENT-CLASS-318-573; US-PATENT-CLASS-364-513; US-PATENT-CLASS-901-19; INT-PATENT-CLASS-G05B-19/42) Avail: US Patent and Trademark Office CSCL 09A

A control system for a multi-motor system such as a space telerobot, having a remote computational node and a local computational node interconnected with one another by a high speed data link is described. A Universal Computer Control System (UCCS) for the telerobot is located at each node. Each node is provided with a multibus computer system which is characterized by a plurality of processors with all processors being connected to a common bus, and including at least one command processor. The command processor communicates over the bus with a plurality of joint controller cards. A plurality of direct current torque motors, of the type used in telerobot joints and telerobot hand-held controllers, are connected to the controller cards and responds to digital control signals from the command processor. Essential motor operating parameters are sensed by analog sensing circuits and the sensed analog signals are converted to digital signals for storage at the controller cards where such signals can be read during an address read/write cycle of the command processing processor.

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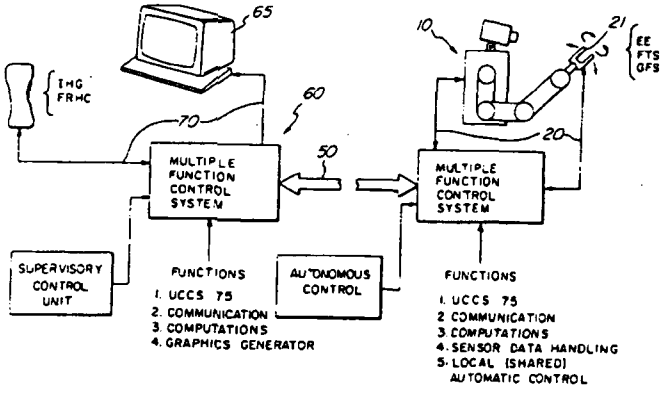

N91-31529* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

LOW COST, FORMABLE, HIGH T(SUB C) SUPERCONDUCTING WIRE Patent

JAMES L. SMIALEK, inventor (to NASA) 17 Sep. 1991 5 p Filed 31 Jan. 1989

(NASA-CASE-LEW-14676-1; US-PATENT-5,049,539; US-PATENT-APPL-SN-305675; US-PATENT-CLASS-505-1; US-PATENT-CLASS-505-701; US-PATENT-CLASS-505-702; US-PATENT-CLASS-505-703; US-PATENT-CLASS-505-704; US-PATENT-CLASS-421-209; US-PATENT-CLASS-421-457) Avail: US Patent and Trademark Office CSCL 09A

A ceramic superconductivity part such as a wire is produced through the partial oxidation of a specially formulated copper alloy in the core. The alloys contain low level quantities of rare earth and alkaline earth dopant elements. Upon oxidation at high temperature, superconducting oxide phases are formed as a thin film.

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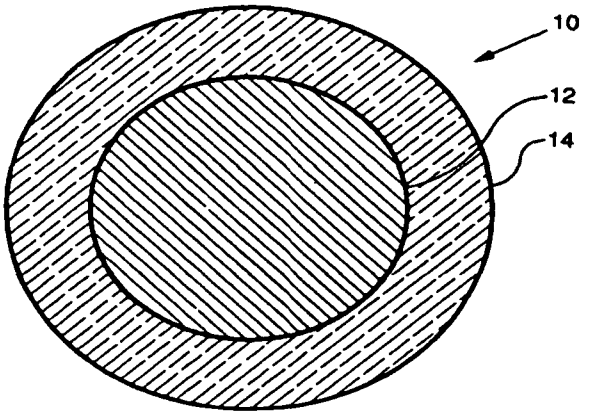

N91-31530* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

EMERGENCY LOCATING TRANSMITTER Patent

PAUL E. WREN, inventor (to NASA) 7 May 1991 12 p Filed 9 Sep. 1988 Division of US-Patent-Appl-SN-921576, filed 21 Oct. 1986

(NASA-CASE-GSC-12821-2; US-PATENT-5,014,340; US-PATENT-APPL-SN-242254; US-PATENT-APPL-SN-921576; US-PATENT-CLASS-455-1; US-PATENT-CLASS-455-99; US-PATENT-CLASS-455-102; INT-PATENT-CLASS-H04K-3/00) Avail: US Patent and Trademark Office CSCL 09A

A transmitter generates three signals for sequential transmission. These signal are an unmodulated r.f. carrier, a r.f. carrier amplitude modulated by a first audio frequency waveform and a r.f. carrier amplitude modulated by a second audio frequency waveform which is distinguishable from the first and which may be employed as a means for identifying a particular transmitter. The composite, sequentially transmitted signal may be varied in terms of the individual signal transmission sequence, the duration of the individual signals, overall composite signal repetition rate and the frequency of the second audio waveform. Various combinations of signal variations may be employed to transmit different information.

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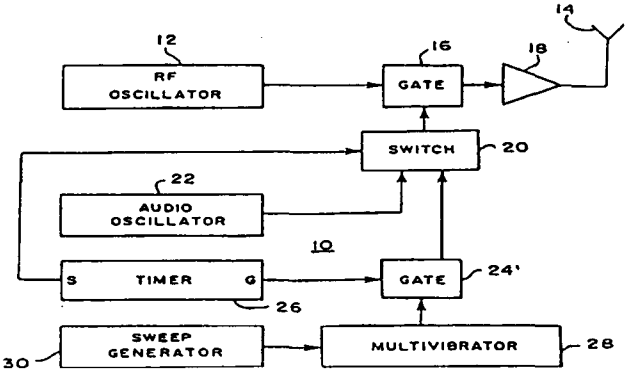


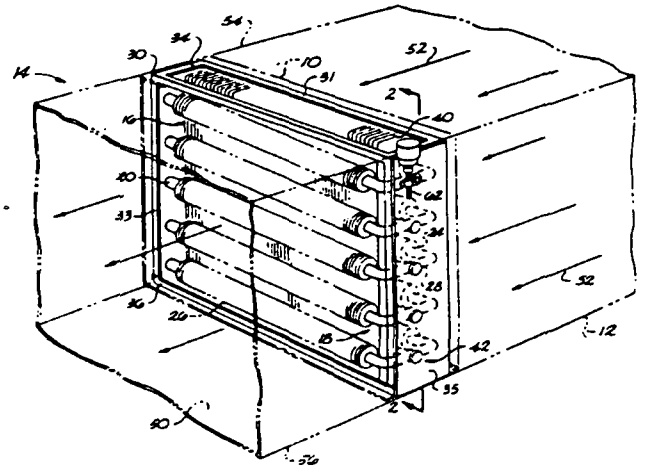
34
FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

N91-21473* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
HEAT TUBE DEVICE Patent
MUKESH K. KHATTAR, inventor (to NASA) (Florida Solar Energy Center, Cape Canaveral.) 20 Nov. 1990 9 p Filed 31 Jan. 1990
(NASA-CASE-KSC-11395-1-CU; US-PATENT-4,971,139; US-PATENT-APPL-SN-473065; US-PATENT-CLASS-165-86; US-PATENT-CLASS-165-96; US-PATENT-CLASS-165-104.14; US-PATENT-CLASS-62-90; US-PATENT-CLASS-62-333; US-PATENT-CLASS-62-384; INT-PATENT-CLASS-F28D-15/02)
Avail: US Patent and Trademark Office CSCL 20D

The present invention discloses a heat tube device through which a working fluid can be circulated to transfer heat to air in a conventional air conditioning system. The heat tube device is disposable about a conventional cooling coil of the air conditioning system and includes a plurality of substantially U-shaped tubes connected to a support structure. The support structure includes members for allowing the heat tube device to be readily positioned about the cooling coil. An actuatable adjustment device is connected to the U-shaped tubes for allowing, upon actuation thereof, for the heat tubes to be simultaneously rotated relative to the cooling coil for allowing the heat transfer from the heat tube device to air in the air conditioning system to be selectively varied.

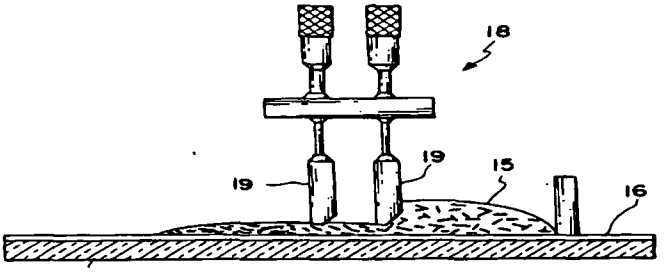
Official Gazette of the U.S. Patent and Trademark Office



N91-23410*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PASSIVE LAMINAR FLOW CONTROL OF CROSSFLOW VORTICITY Patent Application
BRUCE J. HOLMES, inventor (to NASA) 2 Nov. 1990
18 p
(NASA-CASE-LAR-13563-1; NAS 1.71:LAR-13563-1; US-PATENT-APPL-SN-608494) Avail: NTIS HC/MF A03 CSCL 20D

A passive laminar flow crossflow vorticity control system includes an aerodynamic or hydrodynamic surface having geometric perturbations. The perturbations include peaks and valleys having a predetermined spacing and aligned approximately in a streamline direction to force the formation of crossflow vortices. This minimizes amplification and growth of the vortices, thus delaying transition to turbulence and reducing overall drag.

NASA



N91-25380* National Aeronautics and Space Administration. Pasadena Office, CA.
FLUID-LOOP REACTION SYSTEM Patent
BORIS J. LURIE, inventor (to NASA), J. ALAN SCHIER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.), and THEODORE C. ISKENDERIAN, inventor (to NASA) 25 Jun. 1991 12 p Filed 31 Jan. 1990 Supersedes N90-26292 (28 - 20, p 2864)
(Contract NAS7-918)
(NASA-CASE-NPO-17204-1-CU; US-PATENT-5,026,008; US-PATENT-APPL-SN-473242; US-PATENT-CLASS-244-164; US-PATENT-CLASS-244-165; US-PATENT-CLASS-114-122; US-PATENT-CLASS-114-125; INT-PATENT-CLASS-B64G-1/28)
Avail: US Patent and Trademark Office CSCL 20D

An improved fluid actuating system for imparting motion to a body such as a spacecraft is disclosed. The fluid actuating system consists of a fluid mass that may be controllably accelerated through at least one fluid path whereby an opposite acceleration is experienced by the spacecraft. For full control of the spacecraft's orientation, the system would include a plurality of fluid paths. The fluid paths may be circular or irregular, and the fluid paths may be located on the interior or exterior of the spacecraft.

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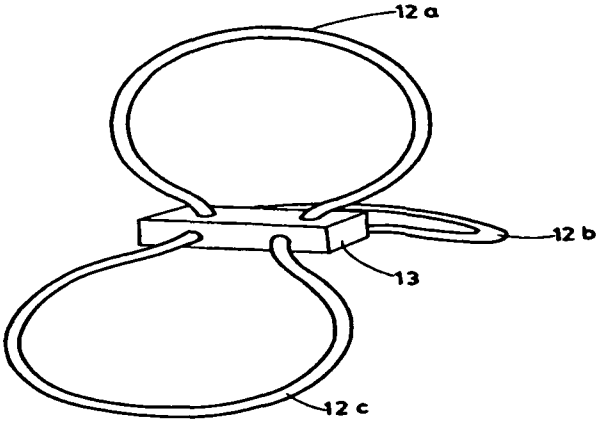
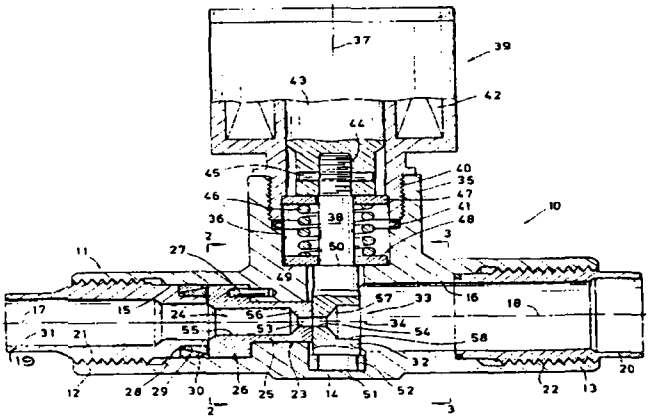


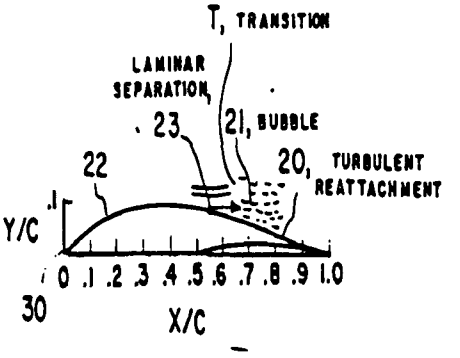
N91-27504* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
VARIABLE ORIFICE FLOW REGULATOR Patent
ROLLIN C. CHRISTIANSON, inventor (to NASA) (Lockheed Engineering and Sciences Co., Las Cruces, NM.) 4 Jun. 1991
18 p Filed 11 Apr. 1990
(NASA-CASE-MSC-21549-1; US-PATENT-5,020,774; US-PATENT-APPL-SN-507553; US-PATENT-CLASS-251-129.15; US-PATENT-CLASS-251-148; US-PATENT-CLASS-251-205; US-PATENT-CLASS-251-326; US-PATENT-CLASS-251-363; INT-PATENT-CLASS-F16K-31/06; INT-PATENT-CLASS-F16K-3/32) Avail: US Patent and Trademark Office CSCL 20D

A flow regulator for high-pressure fluids at elevated temperatures includes a body having a flow passage extending between inlet and outlet openings. First and second orifice members are arranged in the flow passage so at least one of the orifice members can be moved transversely in relation to the flow passage between one operating position where the two orifice openings are aligned for establishing a maximum flow rate of fluids flowing through the flow passage and at least one other operating position in which the two openings are moderately misaligned with one another for establishing a predetermined reduced flow rate of fluids flowing through the flow passage.
Official Gazette of the U.S. Patent and Trademark Office



N91-31596* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR DETECTING LAMINAR FLOW SEPARATION AND REATTACHMENT Patent
JOHN P. STACK, inventor (to NASA) and SIVARAMAKRISHNAN M. MANGALAM, inventor (to NASA) (Analytical Services and Materials, Inc., Hampton, VA.) 26 Jun. 1990 13 p Filed 4 May 1989 Supersedes N91-21472 (29 - 13, p 2082) Division of US-Patent-Appl-SN-203178, filed 7 Jun. 1988
(NASA-CASE-LAR-13952-2-SB; US-PATENT-4,936,146; US-PATENT-APPL-SN-348223; US-PATENT-APPL-SN-203178; US-PATENT-CLASS-73-432.1; INT-PATENT-CLASS-G01F-1/00) Avail: US Patent and Trademark Office CSCL 20D

The invention is a method and apparatus for simultaneously detecting laminar separation and reattachment of a fluid stream such as an airstream from and to the upper surface of an airfoil by simultaneously sensing and comparing a plurality of output signals. Each signal represents the dynamic shear stress at one of an equal number of sensors spaced along a straight line on the surface of the airfoil that extends parallel to the airstream. The output signals are simultaneously compared to detect the sensors across which a reversal in phase of said output signal occurs, said detected sensors being in the region of laminar separation or reattachment.
Official Gazette of the U.S. Patent and Trademark Office

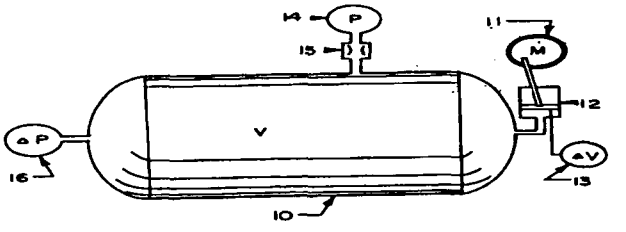


35
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

N91-21493* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
VOLUMETRIC MEASUREMENT OF TANK VOLUME *Patent*
RICHARD T. WALTER, inventor (to NASA),PAULD.VANBUSKIRK, inventor (to NASA) (Lockheed Engineering and Sciences Co., Houston, TX.), WILLIAM F. WEBER, inventor (to NASA), and RICHARD C. FROEBEL, inventor (to NASA) 26 Mar. 1991 8 p Filed 28 Dec. 1989 Supersedes N91-13683 (29 - 5, p 663)
(NASA-CASE-MSC-21500-1; US-PATENT-5,001,924; US-PATENT-APPL-SN-458258; US-PATENT-CLASS-73-149; INT-PATENT-CLASS-G01F-17/00) Avail: US Patent and Trademark Office CSCL 14B

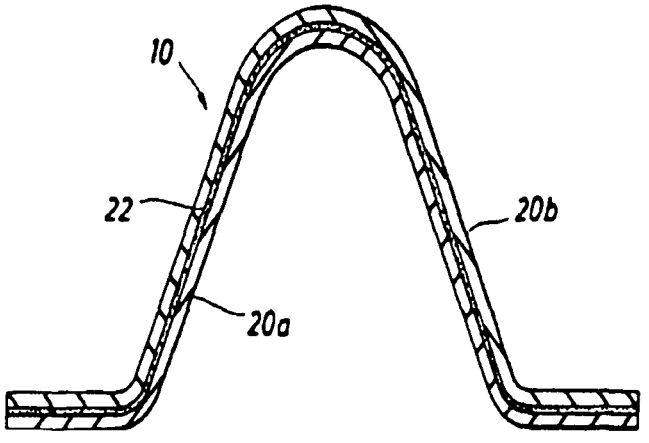
A method is disclosed for determining the volume of compressible gas in a system including incompressible substances in a zero-gravity environment consisting of measuring the change in pressure (delta P) for a known volume change rate (delta V/delta t) in the polytrophic region between isothermal and adiabatic conditions. The measurements are utilized in an idealized formula for determining the change in isothermal pressure (delta P sub iso) for the gas. From the isothermal pressure change (delta iso) the gas volume is obtained. The method is also applicable to determination of gas volume by utilizing work (W) in the compression process. In a passive system, the relationship of specific densities can be obtained.
Official Gazette of the U.S. Patent and Trademark Office



N91-21494* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
FLEXIBLE DIAPHRAGM-EXTREME TEMPERATURE USAGE Patent
GUILLERMO LERMA, inventor (to NASA) (Rockwell International Corp., Canoga Park, CA.) 5 Feb. 1991 8 p Filed 23 Apr. 1987 Division of US-Patent-Appl-SN-771537, filed 30 Aug. 1985
(NASA-CASE-MSC-20797-2; US-PATENT-4,989,497; US-PATENT-APPL-SN-041389; US-PATENT-APPL-SN-771537; US-PATENT-CLASS-92-103SD; US-PATENT-CLASS-92-103F; INT-PATENT-CLASS-F01B-19/00) Avail: US Patent and Trademark Office CSCL 14B

A diaphragm suitable for extreme temperature usage, such as encountered in critical aerospace applications, is fabricated by a unique method, and of a unique combination of materials. The materials include multilayered lay-ups of diaphragm materials sandwiched between layers of bleeder fabrics. After being formed in the desired shape on a mold, they are vacuum sealed and then cured under pressure, in a heated autoclave. A bond capable of withstanding extreme temperatures are produced.

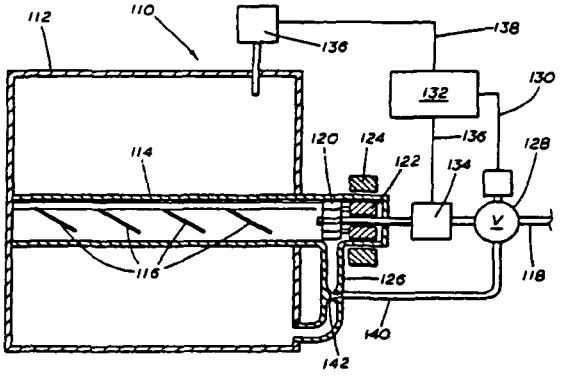
Official Gazette of the U.S. Patent and Trademark Office



N91-21495* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
TANK GAUGING APPARATUS AND METHOD Patent
BRIAN G. MORRIS, inventor (to NASA) 15 Jan. 1991 8 p Filed 28 Feb. 1990 Division of US-Patent-Appl-SN-396726, filed 18 Aug. 1989
(NASA-CASE-MSC-21059-3; US-PATENT-4,984,457; US-PATENT-APPL-SN-486455; US-PATENT-APPL-SN-396726; US-PATENT-CLASS-73-149; INT-PATENT-CLASS-G01F-17/00) Avail: US Patent and Trademark Office CSCL 14B

Apparatus for gauging the amount of liquid in a container of liquid and gas under flow or zero gravity net conditions includes an accumulator and appropriate connector apparatus for communicating gas between the accumulator and the container. In one form of the invention, gas is removed from the container and compressed into the accumulator. The pressure and temperature of the fluid in the container is measured before and after removal of the gas; the pressure and temperature of gas in the accumulator is measured before and after compression of the gas into the accumulator from the container. These pressure and temperature measurements are used in determining the volume of gas in the container, whereby the volume of liquid in the container can be determined from the difference between the known volume of the container and the volume of gas in the container. Gas from the accumulator may be communicated into the container in a similar process as a verification of the gauging of the liquid volume, or as an independent process for determining the volume of liquid in the container.

Official Gazette of the U.S. Patent and Trademark Office



N91-21496* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
WET ATMOSPHERIC GENERATION APPARATUS Patent
RICHARD M. HAMNER, inventor (to NASA) (Teledyne Brown Engineering, Huntsville, AL.) and JANICE K. ALLEN, inventor (to NASA) 20 Mar. 1990 7 p Filed 12 Dec. 1988
(NASA-CASE-MFS-28177-1; US-PATENT-4,909,436; US-PATENT-APPL-SN-283092; US-PATENT-CLASS-236-44A; US-PATENT-CLASS-165-20; US-PATENT-CLASS-236-94; US-PATENT-CLASS-417-190; INT-PATENT-CLASS-B01F-3/02) Avail: US Patent and Trademark Office CSCL 14B

The invention described relates to an apparatus for providing a selectively humidified gas to a camera canister containing cameras and film used in space. A source of pressurized gas (leak test gas or motive gas) is selected by a valve, regulated to a desired pressure by a regulator, and routed through an ejector (venturi device). A regulated source of water vapor in the form of steam from a heated reservoir is coupled to a low pressure region of the ejector which mixes with high velocity gas flow through the ejector. This mixture is sampled by a dew point sensor to obtain dew point thereof (ratio of water vapor to gas) and the apparatus adjusted by varying gas pressure or water vapor to provide a mixture at a connector having selected humidity content.

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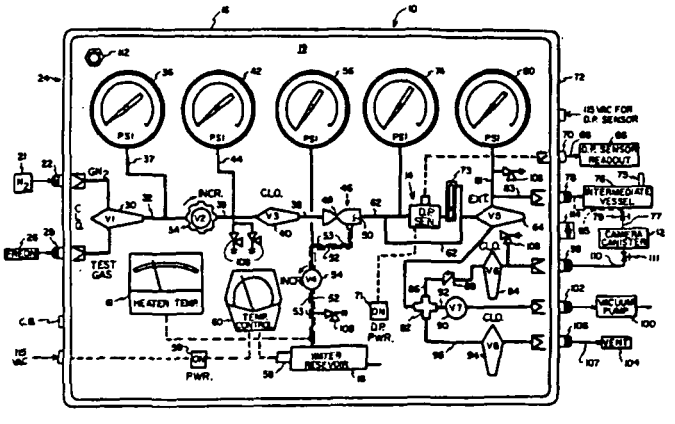
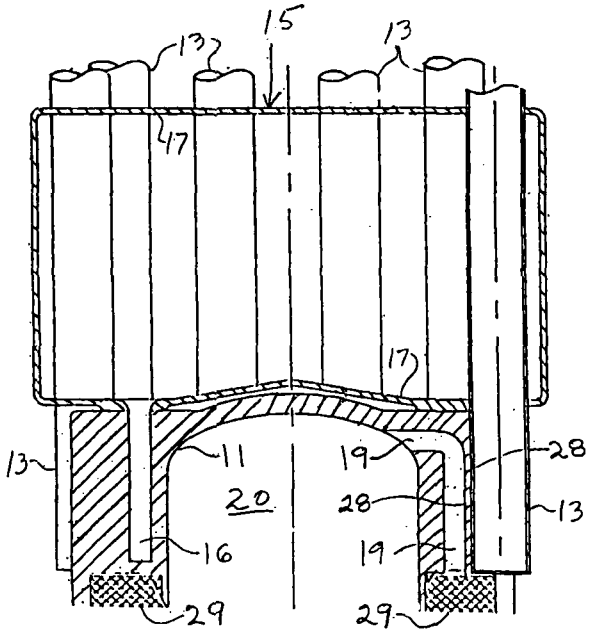


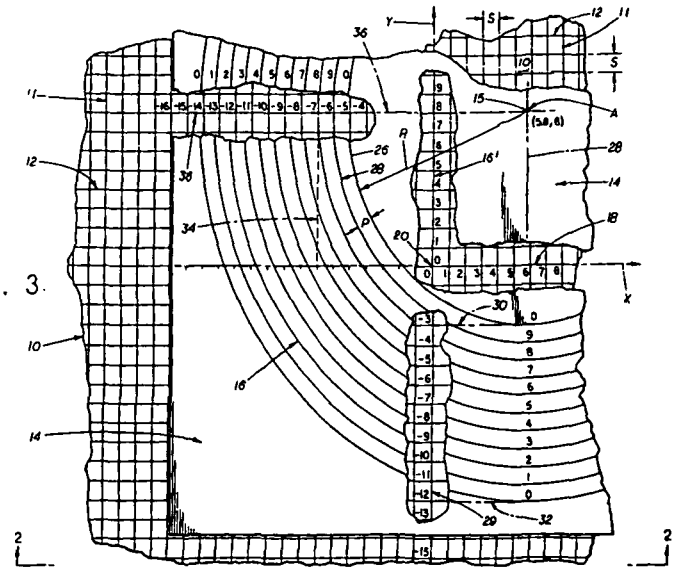
N91-23460*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
METHOD OF PRODUCING A PLUG TYPE HEAT FLUX GAUGE Patent Application
CURT H. LIEBERT, inventor (to NASA) 8 Apr. 1991
13 p
(NASA-CASE-LEW-14967-2; NAS 1.71:LEW-14967-2; US-PATENT-APPL-SN-685962) Avail: NTIS HC/MF A03 CSCL 14B

A method of making a plug-type heat flux gauge in a material specimen in which a thermoplug is integrally formed in the specimen is disclosed. The thermoplug and concentric annulus are formed in the material specimen by electrical discharge machining and trepanning procedures. The thermoplug is surrounded by a concentric annulus through which thermocouple wires are routed. The end of each thermocouple wire is welded to the thermoplug, with each thermocouple wire welded at a different location along the length of the thermoplug.
NASA



N91-23462*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
TWO DIMENSIONAL VERNIER Patent Application
RICHARD D. JUDAY, inventor (to NASA) 14 Jan. 1991
15 p
(NASA-CASE-MSC-21700-1; NAS 1.71:MSC-21700-1; US-PATENT-APPL-SN-640775) Avail: NTIS HC/MF A03 CSCL 14B

A two dimensional vernial scale is disclosed utilizing a cartesian grid on one plate member with a polar grid on an overlying transparent plate member. The polar grid has multiple concentric circles at a fractional spacing of the spacing of the cartesian grid lines. By locating the center of the polar grid on a location on the cartesian grid, interpolation can be made of both the X and Y fractional relationship to the cartesian grid by noting which circles coincide with a cartesian grid line for the X and Y direction.
NASA

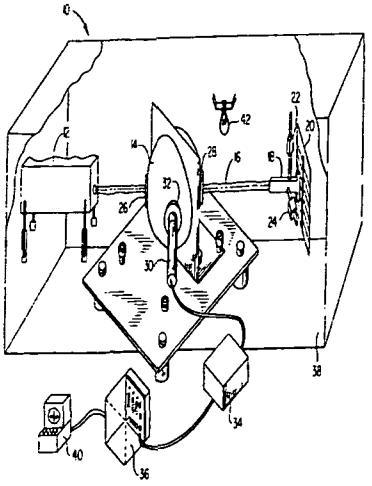


N91-25388*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
RADIATION SENSITIVE AREA DETECTION DEVICE AND METHOD Patent Application
DANIEL C. CARTER, inventor (to NASA), DIANA L. HECHT, inventor (to NASA), and WILLIAM K. WITHEROW, inventor (to NASA) 3 Jun. 1991 24 p
(NASA-CASE-MFS-28563-1; NAS 1.71:MFS-28563-1; US-PATENT-APPL-SN-710193) Avail: NTIS HC/MF A03 CSCL 14B

A radiation sensitive area detection device for use in conjunction with an X ray, ultraviolet or other radiation source is provided which comprises a phosphor containing film which releases a stored diffraction pattern image in response to incoming light or other electromagnetic wave. A light source such as a helium-neon laser, an optical fiber capable of directing light from the laser source onto the phosphor film and also capable of channelling the fluoresced light from the phosphor film to an integrating sphere which directs the light to a signal processing means including a light receiving means such as a photomultiplier tube. The signal processing means allows translation of the fluoresced light in order to detect the original pattern caused by the diffraction of the radiation by the original sample. The optical fiber is retained directly in front of the phosphor screen by a thin metal holder which moves up and down across the phosphor screen and which features a replaceable pinhole which allows easy adjustment of the resolution of the light projected onto the phosphor film. The device produces near real time images with high spatial resolution and without the distortion that accompanies

prior art devices employing photomultiplier tubes. A method is also provided for carrying out radiation area detection using the device of the invention.

NASA



avoid false alarms from traffic and other sound sources in the vicinity of the driver's vehicle.

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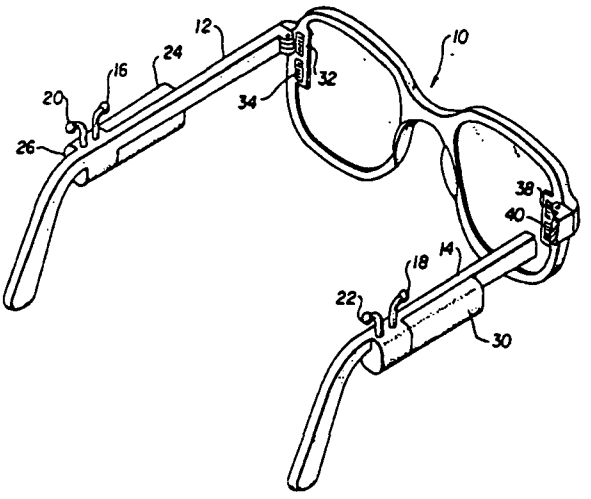


N91-27522* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

VISUAL AID FOR THE HEARING IMPAIRED Patent

MURZBAN D. JHABVALA, inventor (to NASA) and HUNG C. LIN, inventor (to NASA) (Maryland Univ., College Park.) 2 Jul. 1991 14 p Filed 9 Jun. 1989

(NASA-CASE-GSC-13027-1-CU; US-PATENT-5,029,216; US-PATENT-APPL-SN-363807; US-PATENT-CLASS-381-68.1; US-PATENT-CLASS-381-26; US-PATENT-CLASS-381-92; INT-PATENT-CLASS-H04R-25/00) Avail: US Patent and Trademark Office CSCL 14B

A multichannel electronic visual aid device which is able to signal to the user whether sound is coming from the left or right, front or back, or both is presented. For the plurality of channels, which may operate in pairs, the sound is picked up by a respective microphone and amplified and rectified into a DC voltage. The DC voltage is next fed to an analog to digital converter and then to a digital encoder. The binary code from the encoder is coupled into a logic circuit where the binary code is decoded to proved a plurality of output levels which are used to drive an indicator which, in turn, provides a visual indication of the sound level received. The binary codes for each pair of channels are also fed into a digital comparator. The output of the comparator is used to enable the logic circuits of the two channels such that if, for example, the signal coming from the right is louder than that coming from the left, the output of the logic unit of the right channel will be enabled and the corresponding indicator activated, indicating the sound source on the right. An indication of the loudness is also provided. One embodiment of the invention may be carried by the hearing impaired or deaf, as a system which is embedded into eye glasses or a cap. Another embodiment of the invention may be integrated with a vehicle to give a hearing impaired or deaf driver a warning, with a directional indication, that an emergency vehicle is in the vicinity. In this second embodiment, the emergency vehicle transmits a radio frequency signal which would be used as an enabling signal for the visual aid device to

N91-28546*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

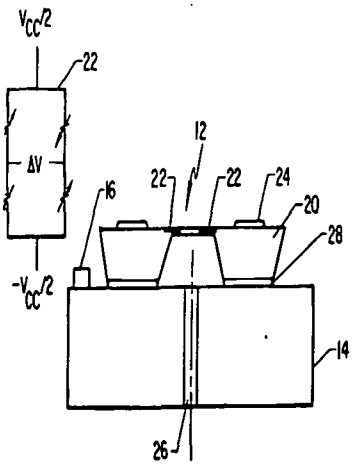
PRESSURE TRANSDUCER AND SYSTEM FOR CRYOGENIC ENVIRONMENTS Patent Application

JOHN J. CHAPMAN, inventor (to NASA) 23 Apr. 1991 31 p

(NASA-CASE-LAR-14579-1; NAS 1.71:LAR-14579-1; US-PATENT-APPL-SN-690198) Avail: NTIS HC/MF A03 CSCL 14B

A silicon pressure die is bonded to a borosilicate substrate above the pneumatic port. A Wheatstone bridge circuit is formed on the silicon pressure die and has bridge elements of silicon doped with boron to a deposit density level of approximately 1 x 10(exp 19)-10(exp 21) boron/cu cm. A current source is provided to excite the Wheatstone bridge circuit. In addition, a temperature sensor is provided to provide temperature readings. An array may be formed of the resulting pressure transducers. This unique solution of materials permits operation of a pressure transducer in cryogenic environments.

NASA



N91-31608* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
PLUG-TYPE HEAT FLUX GAUGE Patent
CURT H. LIEBERT, inventor (to NASA) and JOHN KOCH, JR., inventor (to NASA) 17 Sep. 1991 7 p Filed 31 May 1990 Supersedes N91-13685 (29 -5, p 663)
(NASA-CASE-LEW-14967-1; US-PATENT-5,048,973; US-PATENT-APPL-SN-531433; US-PATENT-CLASS-374-29; US-PATENT-CLASS-374-180; US-PATENT-CLASS-374-208; US-PATENT-CLASS-250-356.1; US-PATENT-CLASS-136-200; INT-PATENT-CLASS-G01K-17/16; INT-PATENT-CLASS-G01K-17/06) Avail: US Patent and Trademark Office CSCL 14B

A plug-type heat flux gauge formed in a material specimen and having a thermoplug integrally formed in the material specimen, and a method for making the same are disclosed. The thermoplug is surrounded by a concentric annulus, through which thermocouple wires are routed. The end of each thermocouple wire is welded to the thermoplug, with each thermocouple wire welded at a different location along the length of the thermoplug. The thermoplug and concentric annulus may be formed in the material specimen by electrical discharge machining and trepanning procedures.

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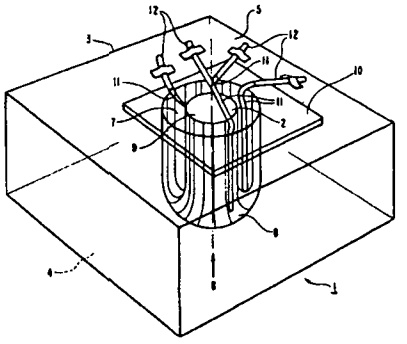


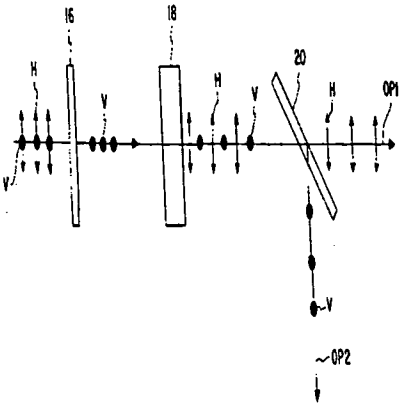
36
LASERS AND MASERS

Includes parametric amplifiers.

N91-23472*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
BIREFRINGENT FILTER DESIGN Patent Application
CLAYTON H. BAIR, inventor (to NASA) 8 Apr. 1991 19 p
(NASA-CASE-LAR-13887-1; NAS 1.71:LAR-13887-1; US-PATENT-APPL-SN-681288) Avail: NTIS HC/MF A03 CSCL 20E

A birefringent filter is provided for tuning the wavelength of a broad band emission laser. The filter comprises thin plates of a birefringent material having thicknesses which are non-unity, integral multiples of the difference between the thicknesses of the two thinnest plates. The resulting wavelength selectivity is substantially equivalent to the wavelength selectivity of a conventional filter which has a thinnest plate having a thickness equal to this thickness difference. The present invention obtains an acceptable tuning of the wavelength while avoiding a decrease in optical quality associated with conventional filters wherein the respective plate thicknesses are integral multiples of the thinnest plate.

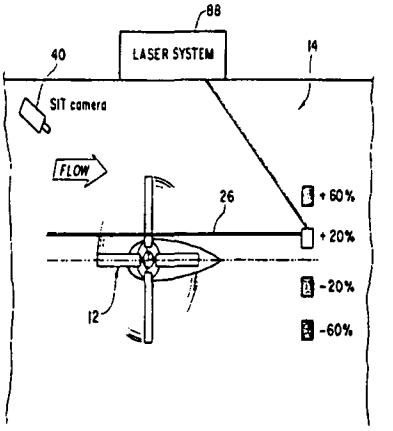
NASA



N91-25392*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SYNCHRONOUS STROBE APPARATUS FOR FLOW VISUALIZATION Patent Application
JOHN M. FRANKE, inventor (to NASA), STEPHEN B. JONES, inventor (to NASA), BRADLEY D. LEIGHTY, inventor (to NASA), and DAVID B. RHODES, inventor (to NASA) 6 May 1991 22 p
(NASA-CASE-LAR-14556-1; NAS 1.71:LAR-14556-1; US-PATENT-APPL-SN-699289) Avail: NTIS HC/MF A03 CSCL 20E

The present invention relates generally to flow visualization and, more specifically, to a strobed laser light curtain used for wind tunnel testing of rotating bodies. A laser produces a continuous beam which is strobed by a Bragg cell. The strobed beam is converted into a laser light curtain by an optics package. A synchronizing circuit provides an output signal to a Bragg cell driver which is coupled to the Bragg cell. The synchronizing circuit allows the user to set the pulsed duration of the strobe, the number of strobes per revolution, and the delay. The invention is particularly useful in wind tunnel testing of rotating blades, but could also be used for measuring other periodic motions.

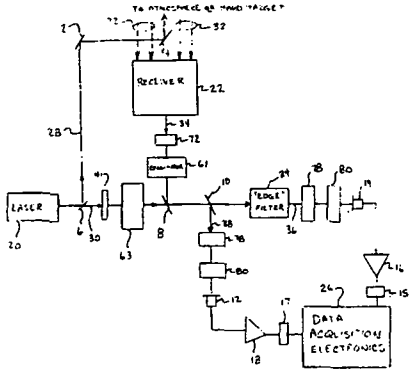
NASA



N91-28557*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
EDGE TECHNIQUE FOR MEASUREMENT OF LASER FREQUENCY SHIFTS INCLUDING THE DOPPLER SHIFT Patent Application
LARRY KORB, inventor (to NASA) 20 May 1991 39 p (NASA-CASE-GSC-13343-1; NAS 1.71:GSC-13343-1; US-PATENT-APPL-SN-702529) Avail: NTIS HC/MF A03 CSCL 20E

A method is disclosed for determining the frequency shift in a laser system by transmitting an outgoing laser beam. An incoming laser beam having a frequency shift is received. A first signal is acquired by transmitting a portion of the incoming laser beam to an energy monitor detector. A second signal is acquired by transmitting a portion of the incoming laser beam through an edge filter to an edge detector, which derives a first normalized signal which is proportional to the transmission of the edge filter at the frequency of the incoming laser beam. A second normalized signal is acquired which is proportional to the transmission of the edge filter at the frequency of the outgoing laser beam. The frequency shift is determined by processing the first and second normalized signals.

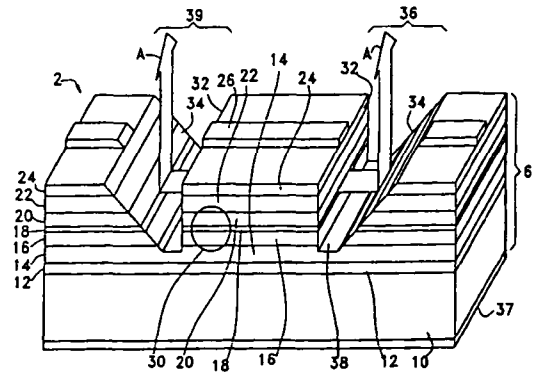
NASA



N91-32489*# National Aeronautics and Space Administration. Pasadena Office, CA.
QUANTUM WELL, BEAM DEFLECTING SURFACE EMITTING LASERS Patent Application
JAE H. KIM, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 5 Jun. 1991 22 p
(Contract NAS7-918)
(NASA-CASE-NPO-18243-1-CU; NAS 1.71:NPO-18243-1-CU; US-PATENT-APPL-SN-710424) Avail: NTIS HC/MF A03 CSCL 20E

This invention relates to surface emitting semiconductor lasers (SELs), with integrated 45 deg. beam deflectors. A SEL is formed on a wafer including vertical mirrors and 45 deg. beam deflectors formed in grooves by tilted ion beam etching. A SEL is a lattice matched, or unstrained, AlGaAs/GaAs GRINSCH SQW SEL. An alternate embodiment is shown, in which a SEL is lattice mismatched, strained or pseudomorphic, or InGaAs/AlGaAs GRINSCH SQW SEL which emits radiation at a wavelength to which its substrate is transparent. Both SELs exhibit high output power, low threshold current density, and relatively high efficiency, and each are processing compatible with conventional large scale integration technology. Such SELs may be fabricated in large numbers from single wafers. The novel features of this invention include the use of tilted ion beam etching to form a pair of grooves each including vertical mirrors and 45 deg. beam deflectors. The embodiment provides substantial circuit design flexibility because radiation may be coupled both up and/or down through the substrate.

NASA



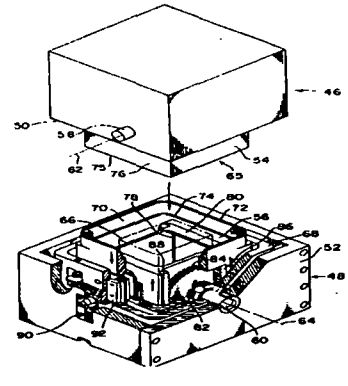
37
MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

N91-21525*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
CONNECTION SPACE REDUCTION MECHANISM Patent Application
MALCOLM BRUCE MILAM, inventor (to NASA) 31 Dec. 1990 17 p
(NASA-CASE-GSC-13220-1; NAS 1.71:GSC-13220-1; US-PATENT-APPL-SN-636532) Avail: NTIS HC/MF A03 CSCL 13I

A connector assembly comprised of two halves, each respectively including a shell type connector subassembly, one being an active half and the other being a passive half. The active half includes an alignment cusp that causes a coupling motion in response to coming in contact with the outer portion of the other half which causes the respective connectors within the two subassemblies to move toward each other into coupling relationship at twice the rate at which the two subassemblies come together. Both halves are adapted to rotate about and translate along respective mutually orthogonal axes to facilitate an interconnection.

NASA



N91-21539* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SINGLE ELEMENT MAGNETIC SUSPENSION ACTUATOR Patent

NELSON J. GROOM, inventor (to NASA) 26 Mar. 1991 9 p Filed 11 Sep. 1989 Supersedes N90-15442 (28 - 7, p 940) (NASA-CASE-LAR-13981-1; US-PATENT-5,003,235; US-PATENT-APPL-SN-405154; US-PATENT-CLASS-318-135; US-PATENT-CLASS-310-90.5; INT-PATENT-CLASS-H02K-41/00) Avail: US Patent and Trademark Office CSCL 13I

The invention, a single element magnetic suspension actuator with bidirectional force capability along a single axis, includes an electromagnet and a nonmagnetic suspended element. A permanent magnet mounted on the suspended element interacts with a magnetic field established by the electromagnet to produce bidirectional forces in response to a variable force command voltage V (sub FC) applied to the electromagnet. A sensor measures the position of the suspended element on the single axis which is a function of force command voltage V (sub FC).

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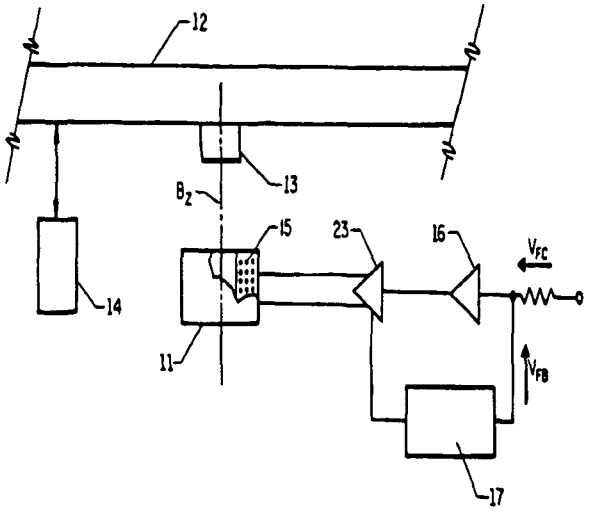

N91-21540* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

FULLY ARTICULATED FOUR-POINT-BEND LOADING FIXTURE Patent

ANTHONY M. CALOMINO, inventor (to NASA) 22 Jan. 1991 7 p Filed 28 Dec. 1989 Supersedes N90-15445 (28 - 7, p 940) (NASA-CASE-LEW-14776-1; US-PATENT-4,986,132; US-PATENT-APPL-SN-458274; US-PATENT-CLASS-73-852; INT-PATENT-CLASS-G01N-3/20) Avail: US Patent and Trademark Office CSCL 13I

A fully articulated four-point bend loading fixture for Modulus of Rupture (MOR) and fracture toughness specimens utilizes an upper loading plate in combination with a lower loading plate. The lower plate has a pair of spring loaded ball bearings which seat in V-shaped grooves located in the upper plate. The ball bearings are carried in the arms of the lower plate. A load is applied to the specimen through steel rollers, one large roller and one smaller roller each located on both the upper and lower plates. The large rollers have needle roller bearings which enable a single loading roller to rotate relative to the plate to which it is attached.

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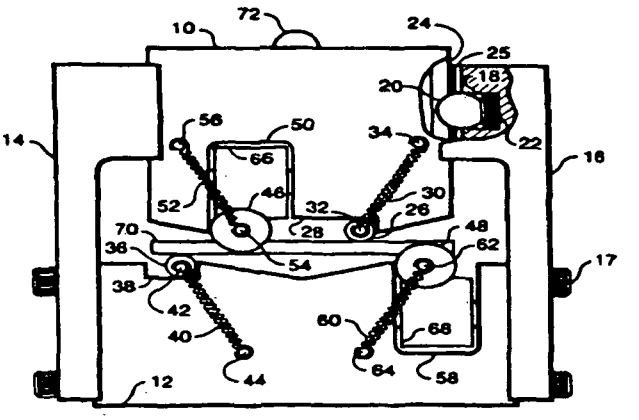

N91-21541* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MECHANICAL STRAIN ISOLATOR MOUNT Patent

GORDON E. JAMES, inventor (to NASA) (TRW Space Technology Labs., Redondo Beach, CA.) 5 Mar. 1991 4 p Filed 27 Nov. 1989 Supersedes N90-16272 (28 - 8, p 1084) (NASA-CASE-LAR-13580-1; US-PATENT-4,997,158; US-PATENT-APPL-SN-441673; US-PATENT-CLASS-248-604; US-PATENT-CLASS-248-593; INT-PATENT-CLASS-F16M-13/00) Avail: US Patent and Trademark Office CSCL 13I

Certain devices such as optical instruments must preserve their alignmental integrity while being subjected to mechanical strain. A mechanical strain isolator mount is provided to preserve the alignmental integrity of an alignment sensitive instrument. An alignment sensitive instrument is mounted on a rectangular base. Flexural legs are connected at their proximal ends to the rectangular base. Flexural legs are also spaced parallel to the sides. Mounting pads are connected to the legs at the distal end and the mechanical strain isolator mount is attached to the substrate by means of threaded bolts. When a mounting pad and its respective leg is subjected to lateral strain in either the X or Y direction via the substrate, the respective leg relieves the strain by bending in the direction of the strain. An axial strain on a mounting pad in the Z direction is relieved by a rotational motion of the legs in the direction of the strain. When the substrate is stress free, the flexural legs return to their original condition and thus preserve the original alignment integrity of the alignment sensitive instrument.

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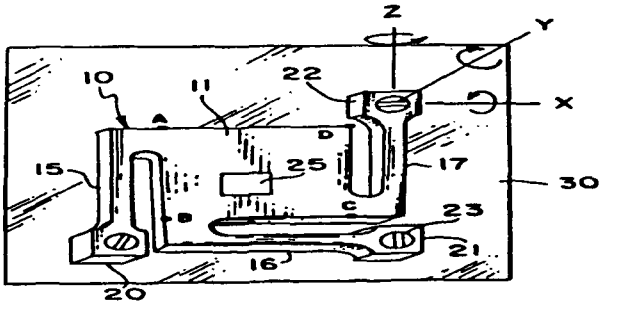

N91-21542* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METHOD AND APPARATUS FOR POSITIONING A ROBOTIC END EFFECTOR Patent
CLIFFORD W. HESS, inventor (to NASA) and LARRY C. H. LI, inventor (to NASA) 25 Dec. 1990 14 p Filed 10 Aug. 1989 Supersedes N90-17137 (28 - 9, p 1230)
(NASA-CASE-MSC-21476-1; US-PATENT-4,980,626; US-PATENT-APPL-SN-392235; US-PATENT-CLASS-318-568.16; US-PATENT-CLASS-318-568.21; US-PATENT-CLASS-318-568.20; US-PATENT-CLASS-901-33; US-PATENT-CLASS-901-37; US-PATENT-CLASS-901-47; US-PATENT-CLASS-364-513)
Avail: US Patent and Trademark Office CSCL 13I

Robotic end effector and operation protocol for a reliable grasp of a target object irrespective of the target's contours is disclosed. A robotic hand includes a plurality of jointed fingers, one of which, like a thumb, is in opposed relation to the other. Each finger is comprised of at least two jointed sections, and provided with reflective proximity sensors, one on the inner surface of each finger section. Each proximity sensor comprises a transmitter of a beam of radiant energy and means for receiving reflections of the transmitted energy when reflected by a target object and for generating electrical signals responsive thereto. On the fingers opposed to the thumb, the proximity sensors on the outermost finger sections are aligned in an outer sensor array and the sensors on the intermediate finger sections and sensors on the innermost finger sections are similarly arranged to form an intermediate sensor array and an inner sensor array, respectively. The invention includes a computer system with software and/or circuitry for a protocol comprising the steps in sequence of: (1) approach axis alignment to maximize the number of outer layer sensors which detect the target; (2) non-contact contour following the target by the robot fingers to minimize target escape potential; and (3) closing to rigidize the target including dynamically re-adjusting the end effector finger alignment to compensate for target motion. A signal conditioning circuit and gain adjustment means are included to maintain the dynamic range of low power reflection signals.

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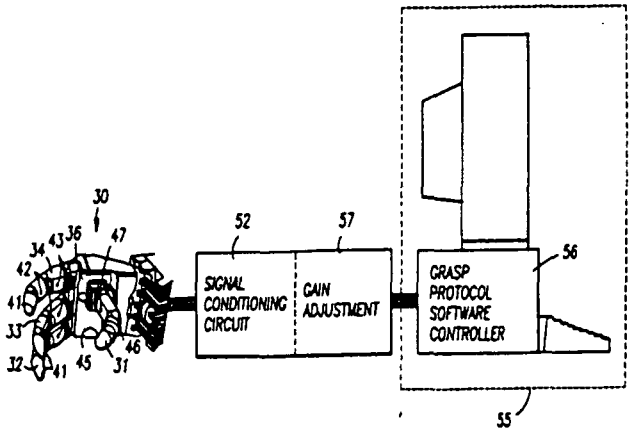

N91-21543* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
ALIGNMENT POSITIONING MECHANISM Patent
PETER M. FANTASIA, inventor (to NASA) 19 Mar. 1991 9 p Filed 26 Jan. 1990 Supersedes N90-26341 (28 - 20, p 2872)
(NASA-CASE-MSC-21502-1; US-PATENT-5,000,416; US-PATENT-APPL-SN-470663; US-PATENT-CLASS-248-650; US-PATENT-CLASS-248-677; US-PATENT-CLASS-248-181; US-PATENT-CLASS-254-101; US-PATENT-CLASS-DIG.4; US-PATENT-CLASS-403-131; INT-PATENT-CLASS-F16M-13/00)
Avail: US Patent and Trademark Office CSCL 13I

An alignment positioning mechanism for correcting and compensating for misalignment of structures to be coupled is disclosed. The mechanism comprises a power screw with a base portion and a threaded shank portion. A mounting fixture is provided for rigidly coupling said base portion to the mounting interface of a supporting structure with the axis of the screw perpendicular thereto. A traveling ball nut threaded on the power screw is formed with an external annular arcuate surface configured in the form of a spherical segment and enclosed by a ball nut housing with a conforming arcuate surface for permitting gimballed motion thereon. The ball nut housing is provided with a mounting surface which is positionable in cooperable engagement with the mounting interface of a primary structure to be coupled to the supporting structure. Cooperative means are provided on the ball nut and ball nut housing, respectively, for positioning the ball nut and ball nut housing in relative gimballed position within a predetermined range of relative angular relationship whereby severe structural stresses due to unequal loadings and undesirable bending moments on the mechanism are avoided.

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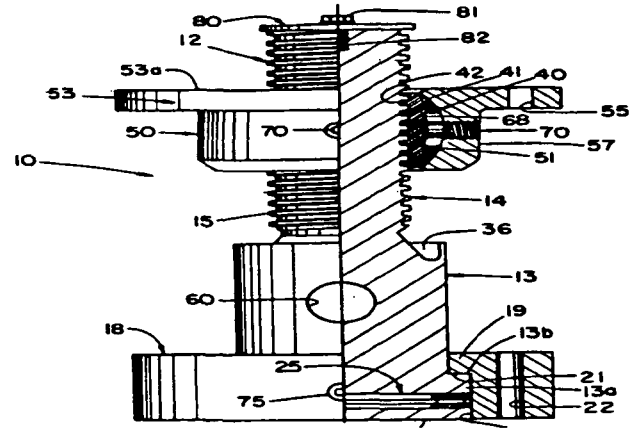

N91-21544* National Aeronautics and Space Administration. Pasadena Office, CA.
METHOD AND APPARATUS FOR CONFIGURATION CONTROL OF REDUNDANT ROBOTS Patent
HOMAYOUN SERAJI, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 Mar. 1991 22 p Filed 28 Dec. 1989 Supersedes N90-27110 (28 - 21, p 3010)
(Contract NAS7-918)
(NASA-CASE-NPO-17801-1-CU; US-PATENT-4,999,553; US-PATENT-APPL-SN-459029; US-PATENT-CLASS-318-561; US-PATENT-CLASS-318-646; US-PATENT-CLASS-318-648; US-PATENT-CLASS-318-628; US-PATENT-CLASS-364-478; US-PATENT-CLASS-364-513; US-PATENT-CLASS-901-9) Avail: US Patent and Trademark Office CSCL 13I

A method and apparatus to control a robot or manipulator configuration over the entire motion based on augmentation of

the manipulator forward kinematics is disclosed. A set of kinematic functions is defined in Cartesian or joint space to reflect the desirable configuration that will be achieved in addition to the specified end-effector motion. The user-defined kinematic functions and the end-effector Cartesian coordinates are combined to form a set of task-related configuration variables as generalized coordinates for the manipulator. A task-based adaptive scheme is then utilized to directly control the configuration variables so as to achieve tracking of some desired reference trajectories throughout the robot motion. This accomplishes the basic task of desired end-effector motion, while utilizing the redundancy to achieve any additional task through the desired time variation of the kinematic functions. The present invention can also be used for optimization of any kinematic objective function, or for satisfaction of a set of kinematic inequality constraints, as in an obstacle avoidance problem. In contrast to pseudoinverse-based methods, the configuration control scheme ensures cyclic motion of the manipulator, which is an essential requirement for repetitive operations. The control law is simple and computationally very fast, and does not require either the complex manipulator dynamic model or the complicated inverse kinematic transformation. The configuration control scheme can alternatively be implemented in joint space.

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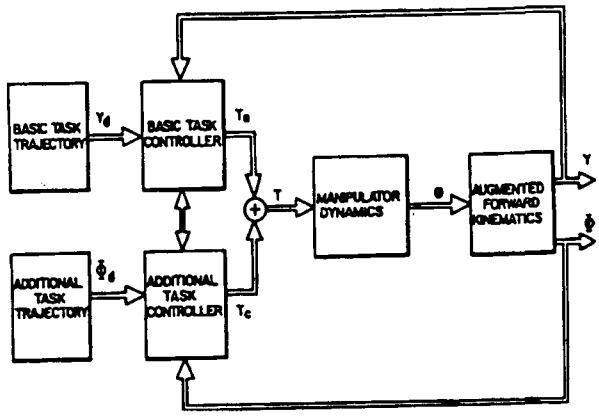

N91-21545* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

SAMPLE HOLDER SUPPORT FOR MICROSCOPES Patent

ANTHONY BERRY, inventor (to NASA) and BILLY H. NERREN, inventor (to NASA) 1 Jan. 1991 4 p Filed 15 May 1990 Supersedes N90-27113 (28 - 21, p 3010)
(NASA-CASE-MFS-28420-1; US-PATENT-4,981,345; US-PATENT-APPL-SN-523675; US-PATENT-CLASS-350-529; US-PATENT-CLASS-269-21; INT-PATENT-CLASS-G02B-21/26; INT-PATENT-CLASS-G02B-21/32; INT-PATENT-CLASS-B25B-11/00) Avail: US Patent and Trademark Office CSCL 13I

A sample filter holder is disclosed for use with a microscope for holding the filter in a planar condition on the stage of the microscope so that automatic focusing of the microscope can be performed on particle samples dispersed on the filter. The holder includes a base having a well that communicates with an inlet port which is connected to a suction pump. A screen assembly is positioned within the well. The screen assembly includes a disk having a screen positioned on its top surface and secured to the disk at the peripheral edge of the screen. Small bores allow the outer surface of the screen to communicate with the well. The filter is placed on the screen and is held in a flat disposition by the suction forces.

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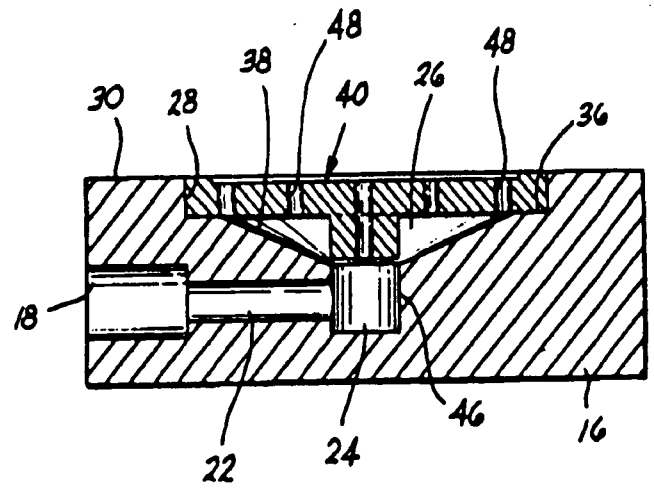


N91-23490*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

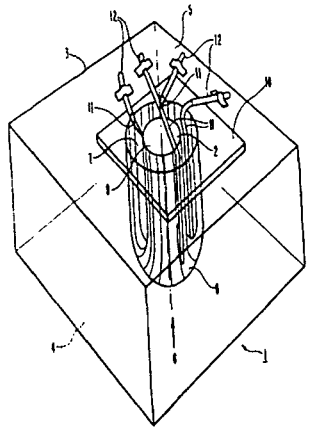
ELECTROMAGNETIC ATTACHMENT MECHANISM Patent Application

LEO G. MONFORD, JR., inventor (to NASA) 31 Dec. 1990 36 p
(NASA-CASE-MSC-21463-1; NAS 1.71:MSC-21463-1; US-PATENT-APPL-SN-636531) Avail: NTIS HC/MF A03 CSCL 13I

An electromagnetic attachment mechanism is disclosed for use as an end effector of a remote manipulator system. A pair of electromagnets, each with a U-shaped magnetic core with a pull-in coil and two holding coils are mounted by a spring suspension system on a base plate of the mechanism housing with end pole pieces adapted to move through openings in the base plate when the attractive force of the electromagnets is exerted on a strike plate of a grapple fixture affixed to a target object. The pole pieces are spaced by an air gap from the strike plate when the mechanism first contacts the grapple fixture. An individual control circuit and power source is provided for the pull-in coil and one holding coil of each electromagnet. A back-up control circuit connected to the two power sources and a third power source is provided for the remaining holding coils. When energized, the pull-in coils overcome the suspension system and air gap and are automatically de-energized when the pole pieces move to grapple and impose a preload force across the grapple interface. A battery backup is a redundant power source for each electromagnet in each individual control circuit and is automatically connected upon failure of the primary source. A centerline mounted camera and video monitor are used in cooperation with a target

pattern on the reflective surface of the strike plate to effect targeting and alignment.

NASA



N91-23491*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METALLIC THREADED COMPOSITE FASTENER Patent Application
THOMAS J. DUNN, inventor (to NASA) 31 Jan. 1991 14 p
(NASA-CASE-MSC-21580-1; NAS 1.71:MSC-21580-1; US-PATENT-APPL-SN-648772) Avail: NTIS HC/MF A03 CSCL 13I

A metallic threaded composite fastener, particularly suited for high temperature applications, has a body member made of high temperature resistant composite material with a ceramic coating. The body member has a head portion configured to be installed in a countersunk hole and a shank portion which is noncircular and tapered. One part of the shank may be noncircular and the other part tapered, or the two types of surface could be combined into a frustum of a noncircular cone. A split collar member made of high strength, high temperature tolerant metal alloy is split into two halves and the interior of the halves are configured to engage the shank. The exterior of the collar has a circumferential groove which receives a lock ring to secure the collar halves to the shank. In the assembled condition torque may be transmitted from the body to the split collar by the engaged noncircular portions to install and remove the fastener assembly into or from a threaded aperture and shear loads in the collar threads are transferred to the shank tapered portion as a combination of radial compression and axial tension loads. Thus, tension loads may be applied to the fastener shank without damaging the ceramic coating.

NASA

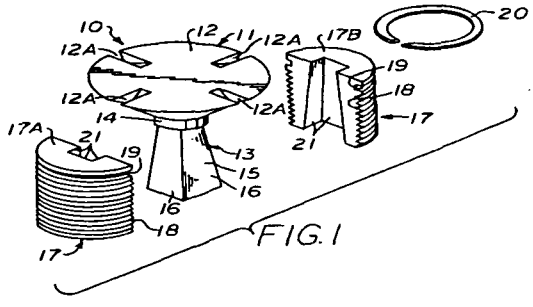
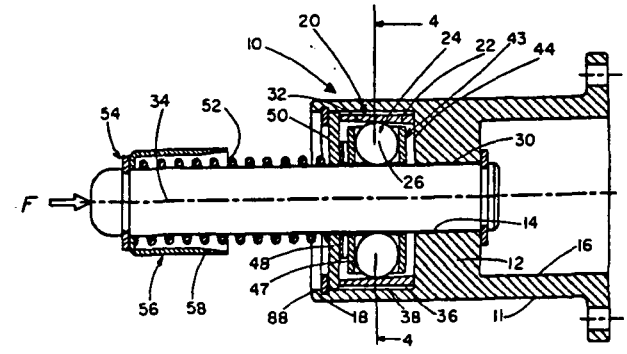


FIG. 1

N91-23492*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
ENERGY DISSIPATOR Patent Application
HORACIO M. DELAFUENTE, inventor (to NASA), KORNEL NAGY, inventor (to NASA), and CLARENCE J. WESSELSKI, inventor (to NASA) 15 Feb. 1991 17 p
(NASA-CASE-MSC-21555-1; NAS 1.71:MSC-21555-1; US-PATENT-APPL-SN-656925) Avail: NTIS HC/MF A03 CSCL 13I

An all metal energy dissipator construction is disclosed for dissipating kinetic energy force (F) by rolling balls which are forced by a tapered surface on an expandable sleeve to frictionally load a force rod. The balls are maintained in an initial position by a plate member which is biased by a spring member. A spring member returns the force rod to its initial position after a loading force is removed.

NASA

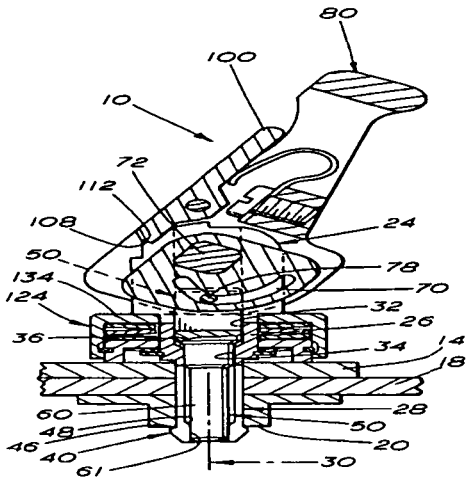


N91-23493*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
PRELOADED LATCHING DEVICE Patent Application
CLARENCE J. WESSELSKI, inventor (to NASA) and KORNEL NAGY, inventor (to NASA) 25 Feb. 1991 20 p
(NASA-CASE-MSC-21730-1; NAS 1.71:MSC-21730-1; US-PATENT-APPL-SN-660755) Avail: NTIS HC/MF A03 CSCL 13I

A latching device is disclosed which is lever operated sequentially to actuate a set of collet fingers to provide a radial expansion and to actuate a force mechanism to provide a compressive gripping force for attaching first and second devices to one another. The latching device includes a body member having elongated collet fingers which, in a deactuated condition, is insertable through bores on the first and second devices so that gripping terminal portions on the collet fingers are proximate to the end of the bore of the first device while a spring assembly on the body member is located proximate to the outer surface of a second device. A lever is rotatable through 90 deg to move a latching rod to sequentially actuate and expand collet fingers and to actuate the spring assembly by compressing it. During the first 30 deg of movement of the lever, the collet fingers are actuated by the latching rod to provide a radial expansion and during the last 60 deg of movement of the lever, the spring assembly acts as a force mechanism and is actuated to develop a compressive latching force on the devices. The latching rod and lever are connected by a camming mechanism. The amount of spring force in the spring assembly can be adjusted; the body member can be

permanently attached by a telescoping assembly to one of the devices; and the structure can be used as a pulling device for removing annular bearings or the like from blind bores.

NASA



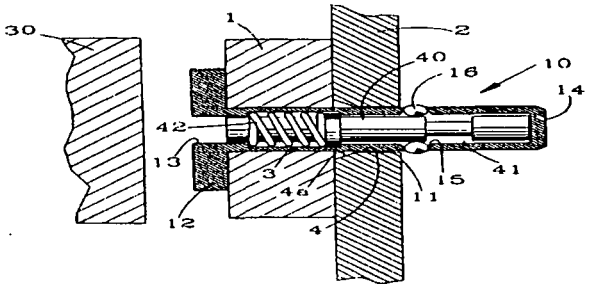
N91-24577*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

METHOD AND APPARATUS FOR RELEASABLY CONNECTING FIRST AND SECOND OBJECTS Patent Application

LEO G. MONFORD, JR., inventor (to NASA) 13 Feb. 1991 20 p (NASA-CASE-MSC-21517-1; NAS 1.71:MSC-21517-1; US-PATENT-APPL-SN-654704) Avail: NTIS HC/MF A03 CSCL 13I

The apparatus and method are disclosed for releasably connecting first and second objects, where a magnetic end effector may include at least one elongated pin number, a proximal end of which is connected to the first object and the distal end of which may be inserted into a receiving portion in the second object. Latch members are carried by the pin member for radial movement between retracted and expanded positions for releasing and locking, respectively, first and second objects. A plunger member carried by the pin member is axially moveable between first and second positions. In the first plunger position, the latch members are located in the expanded (locked) position and in the second plunger position the latch members are released for movement to retracted or unlocked position. The magnetic end effector is provided for releasable attachment to the first object and for moving the plunger member to the second position, releasing the first object.

NASA



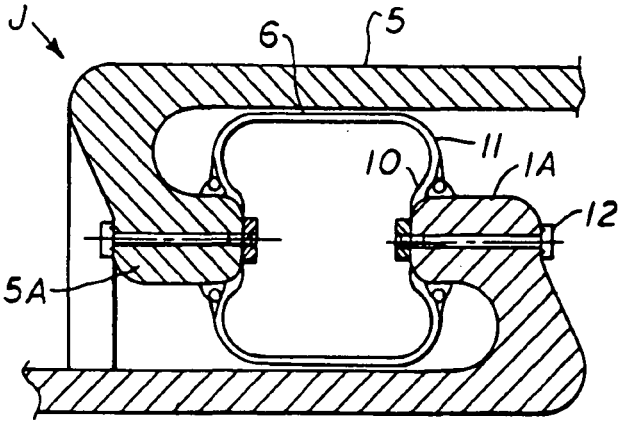
N91-25415*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

PRESSURE VESSEL FLEX JOINT Patent Application

JON KAHN, inventor (to NASA) 19 Feb. 1991 23 p (NASA-CASE-MSC-21748-1; NAS 1.71:MSC-21748-1; US-PATENT-APPL-SN-657598) Avail: NTIS HC/MF A03 CSCL 13K

An airtight, flexible joint is disclosed for the interfacing of two pressure vessels such as between the Space Station docking tunnel and the Space Shuttle Orbiter bulkhead adapter. The joint provides for flexibility while still retaining a structural link between the two vessels required due to the loading created by the internal/external pressure differential. The joint design provides for limiting the axial load carried across the joint to a specific value, a function returned in the Orbiter/Station tunnel interface. The flex joint comprises a floating structural segment which is permanently attached to one of the pressure vessels through the use of an inflatable seal. The geometric configuration of the joint causes the tension between the vessels created by the internal gas pressure to compress the inflatable seal. The inflation pressure of the seal is kept at a value above the internal/external pressure differential of the vessels in order to maintain a controlled distance between the floating segment and pressure vessel. The inflatable seal consists of either a hollow torus-shaped flexible bladder or two rolling convoluted diaphragm seals which may be reinforced by a system of straps or fabric anchored to the hard structures. The joint acts as a flexible link to allow both angular motion and lateral displacement while it still contains the internal pressure and holds the axial tension between the vessels.

NASA



N91-26542*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

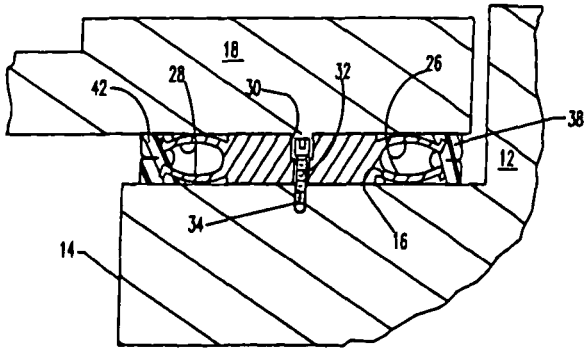
DOUBLE FACE SEALING DEVICE Patent Application

BRUCE WEDDENDORF, inventor (to NASA) 19 Feb. 1991 16 p (NASA-CASE-MFS-28521-1; NAS 1.71:MFS-28521-1; US-PATENT-APPL-SN-657586) Avail: NTIS HC/MF A03 CSCL 11A

A double face sealing device is disclosed for mounting between two surfaces to provide an air-tight and fluid-tight seal between a closure member bearing one of the surfaces and a structure or housing bearing the other surface which extends around the opening or hatchway to be closed. The double face sealing device includes a plurality of sections or segments mounted to one of the surfaces, each having a main body portion, a pair of outwardly extending and diverging, cantilever, spring arms, and a pair of inwardly extending and diverging, cantilever, spring arms,

an elastomeric cover on the distal, free ends of the outwardly extending and diverging spring arms, and an elastomeric cover on the distal, free, ends of the outwardly extending and diverging spring arms, and an elastomeric cover on the distal, free ends of the inwardly extending and diverging spring arms. The double face sealing device has application or use in all environments requiring a seal, but is particularly useful to seal openings or hatchways between compartments of spacecraft or aircraft.

NASA



N91-26543*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

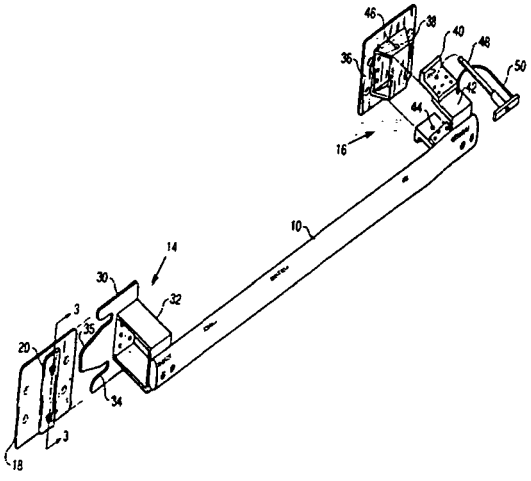
REMOVABLE HAND HOLD Patent Application

ROBERT D. CORRIGAN, inventor (to NASA) and ROBERT L. HAUER, inventor (to NASA) 15 Apr. 1991 13 p

(NASA-CASE-LEW-15196-1; NAS 1.71:LEW-15196-1; US-PATENT-APPL-SN-687606) Avail: NTIS HC/MF A03 CSCL 13K

A hand hold utilizes joining means which comprises two different mounting brackets that are permanently fastened to a supporting structure. An alignment/capture bracket is disposed at one end of the hand rail or hand hold which mates with one of the mounting brackets. A securing bracket is disposed at the opposite end of the hand rail/hand hold which connects with the other mounting bracket by means of a locking device. The alignment/capture bracket has a central tapered tongue with two matching slots disposed on each side.

NASA



N91-27560* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

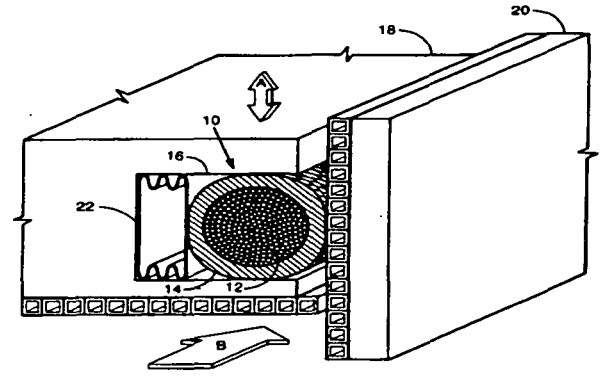
HIGH-TEMPERATURE, FLEXIBLE, THERMAL BARRIER SEAL Patent

PAUL J. SIROCKY, inventor (to NASA) and BRUCE M. STEINETZ, inventor (to NASA) 14 May 1991 13 p Filed 27 Nov. 1989

(NASA-CASE-LEW-14672-1; US-PATENT-5,014,917; US-PATENT-APPL-SN-441672; US-PATENT-CLASS-239-265.11; US-PATENT-CLASS-277-34; US-PATENT-CLASS-277-157; US-PATENT-CLASS-277-226; US-PATENT-CLASS-277-229; INT-PATENT-CLASS-B64D-33/04; INT-PATENT-CLASS-F16J-15/46) Avail: US Pátent and Trademark Office CSCL 13I

This device seals the sliding interfaces between structural panels that are roughly perpendicular to each other or whose edges are butted against one another. The nonuniformity of the gap between the panels requires significant flexibility along the seal length. The seal is mounted in a rectangular groove in a movable structural panel. A plurality of particles or balls is densely packed in an outer sheathing. The balls are laterally preloaded to maintain sealing contact with the adjacent wall using a pressurized linear bellows. Distortions in the adjacent panel are accommodated by rearrangement of the particles within the outer sheathing. Leakage through the seal is minimized by densely compacting the internal particles and by maintaining positive preload along the back side of the seal. The braid architecture of the outer sheathing is selected to minimize leakage through the seal and to resist mechanical abrasion.

Official Gazette of the U.S. Patent and Trademark Office



N91-27561* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

QUICK ACTION CLAMP Patent

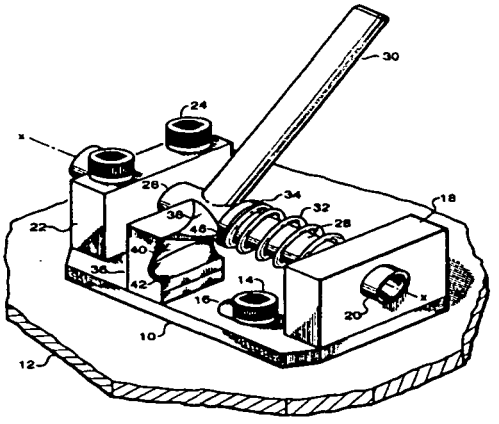
FRANK S. CALCO, inventor (to NASA) 16 Jul. 1991 8 p Filed 30 Mar. 1990

(NASA-CASE-LEW-14887-1; US-PATENT-5,032,045; US-PATENT-APPL-SN-503418; US-PATENT-CLASS-410-80; US-PATENT-CLASS-410-84; US-PATENT-CLASS-292-60; US-PATENT-CLASS-292-61; INT-PATENT-CLASS-B60P-7/15; INT-PATENT-CLASS-E05C-5/04) Avail: US Patent and Trademark Office CSCL 13K

A quick release toggle clamp that utilizes a spring that requires a deliberate positive action for disengagement is

presented. The clamp has a sliding bolt that provides a latching mechanism. The bolt is moved by a handle that tends to remain in an engaged position while under tension.

Official Gazette of the U.S. Patent and Trademark Office



N91-27562* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

WET SPINNING OF SOLID POLYAMIC ACID FIBERS Patent

WILLIAM E. DOROGY, JR., inventor (to NASA) and ANNE K. ST.CLAIR, inventor (to NASA) 11 Jun. 1991 9 p Filed 26 Jun. 1990

(NASA-CASE-LAR-14489-1; US-PATENT-5,023,034; US-PATENT-APPL-SN-543926; US-PATENT-CLASS-264-184; US-PATENT-CLASS-264-211.15; US-PATENT-CLASS-264-211.16; US-PATENT-CLASS-264-211.17; US-PATENT-CLASS-264-234; US-PATENT-CLASS-264-236; US-PATENT-CLASS-264-345) Avail: US Patent and Trademark Office CSCL 13H

The invention is a process for the production of solid aromatic polyamic acid and polyimide fibers from a wet gel or coagulation bath wet gel using N,N-dimethylacetamide (DMAc) solutions of the polyamic acid derived from aromatic dianhydrides such as 3,3',4,4' benzophenonetetra carboxylic dianhydride (BTDA) and aromatic diamines such as 4,4'-oxydianiline (4,4'-ODA). By utilizing the relationship among coagulation medium and concentration, resin inherent viscosity, resin percent solids, filament diameter, and fiber void content, it is possible to make improved polyamic acid fibers. Solid polyimide fibers, obtained by the thermal cyclization of the polyamic acid precursor, have increased tensile properties compared to fibers containing macropores from the same resin system.

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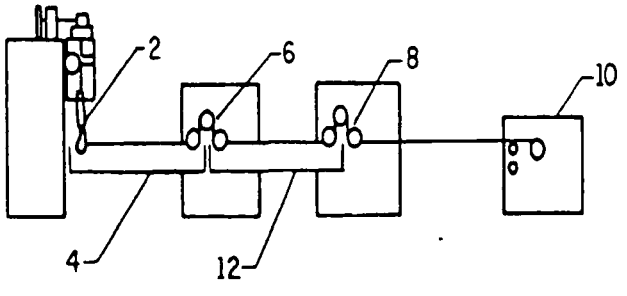


N91-28578*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

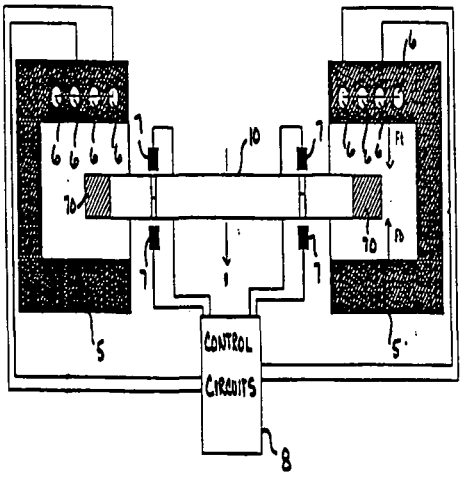
IMPROVED SUPERCONDUCTING BEARINGS Patent Application

YURY FLOM, inventor (to NASA) and JAMES D. ROYSTON, inventor (to NASA) 17 Apr. 1991 24 p

(NASA-CASE-GSC-13346-1; NAS 1.71:GSC-13346-1; US-PATENT-APPL-SN-691609) Avail: NTIS HC/MF A03 CSCL 13I

An improved superconducting bearing is presented. Rotor is confined within two superconducting circular bearing structures, each of which has a number of embedded heating elements, and will levitate rotor which has embedded magnets in its end. Heating elements are connected to a feedback control unit, as are rotor position sensors. The temperature profiles of each circular bearing structure is then adjusted according to the information on rotor position provided to control unit by position sensors. Novelty is believed to reside in providing a superconducting circular bearing structure allowing for a control of the levitating forces.

NASA



N91-28579*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

ROLLER LOCKING BRAKE Patent Application

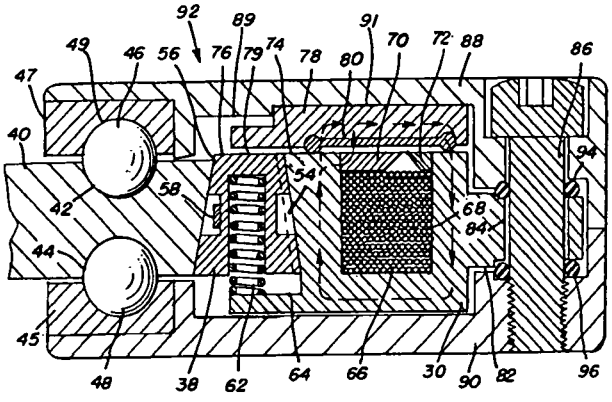
JOHN M. VRANISH, inventor (to NASA) 28 Mar. 1991 17 p

(NASA-CASE-GSC-13376-1; NAS 1.71:GSC-13376-1; US-PATENT-APPL-SN-677008) Avail: NTIS HC/MF A03 CSCL 13I

A roller locking brake structure includes a roller locking/lifting ring, a housing, a set of conical locking rollers, a striker ring, and a drive disc. The roller locking/lifting ring includes respective V-shaped locking cam surface segments for each locking roller which is in the form of a truncated cone and provides a force and torque reaction surface for forces and torques generated in the braking process as well as providing a channel for a magnetic coil and flux return path of a magnetic circuit used to release a conical roller when the brake is off. The locking conical rollers couple the ring to the rim surfaces of the drive disc which provides another cam surface. The striker ring is located adjacent the rollers and is pulled down against the small end of the rollers by an

electromagnetic coil when energized to decouple the locking rollers from the drive disc and thus cease the braking action.

NASA



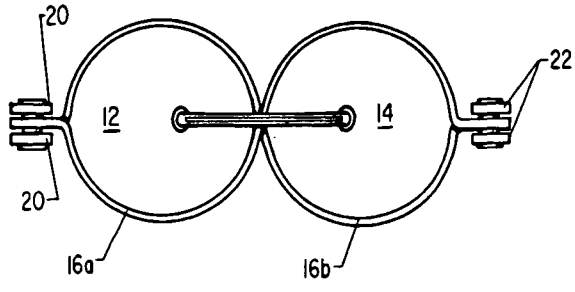
N91-28580*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NONCIRCULAR ROLLING JOINTS FOR VIBRATIONAL REDUCTION IN SLEWING MANEUVERS Patent Application

MENG-SANG CHEW, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.), JER-NAN JUANG, inventor (to NASA), and LI-FARN YANG, inventor (to NASA) 28 Mar. 1991 22 p (NASA-CASE-LAR-14515-1-CU; NAS 1.71:LAR-14515-1-CU; US-PATENT-APPL-SN-678551) Avail: NTIS HC/MF A03 CSCL 13K

A rolling joint is provided for obtaining slewing maneuvers for various apparatus including space structures, space vehicles, robotic manipulators and simulators. Two noncircular cylinders, namely a drive and a driven cylinder, are provided in driving contact with one another. This contact is maintained by two pairs of generally S-shaped bands, each pair forming a generally 8-shaped coupling tightly about the circumferential periphery of the noncircular drive and driven cylinders. A stationarily fixed arm extends between and is rotably journalled with a drive axle and a spindle axle respectively extending through selected rotational points of the drive cylinder and of the driven cylinder. The noncircular cylinders are profiled to obtain the desired varying gear ratio. The novelty of the present invention resides in using specifically profiled noncircular cylinders to obtain a desired varying gear ratio.

NASA



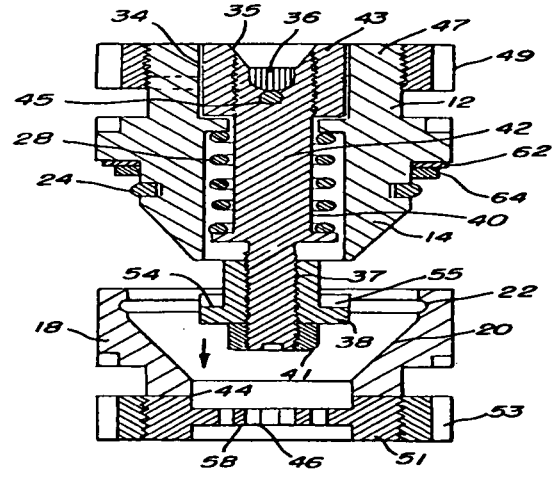
N91-28581*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

SPLINE-LOCKING PAYLOAD FASTENER Patent Application

JOHN M. VRANISH, inventor (to NASA) 5 Jun. 1991 17 p (NASA-CASE-GSC-13378-1; NAS 1.71:GSC-13378-1; US-PATENT-APPL-SN-710633) Avail: NTIS HC/MF A03 CSCL 13K

The invention consists of a locking spline payload fastener comprised of a spring-loaded male spline nut located at the tip of a threaded male positioning member that is affixed to a body being fastened. A complimentary female type spline fitting adapted to engage the spline nut is located at the lower end of a female conical receiving member which is affixed to a receiving body to which the payload body is being fastened. During a fastening guidance and mating procedure, the male nut and female spline fitting are aligned in a soft docking phase which is followed by a forward movement of the spline nut against and into the female spline fitting. This is then followed by a rotation of the male spline nut into a locking arrangement with the female spline fitting. To release the fastener, the process is reversed. Novelty is believed to reside in the concept of a self aligning spline system including a threaded male spline nut which upon engaging a female spline fitting, travels up a driven threaded shank to effect a locking operation.

NASA



N91-28582*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

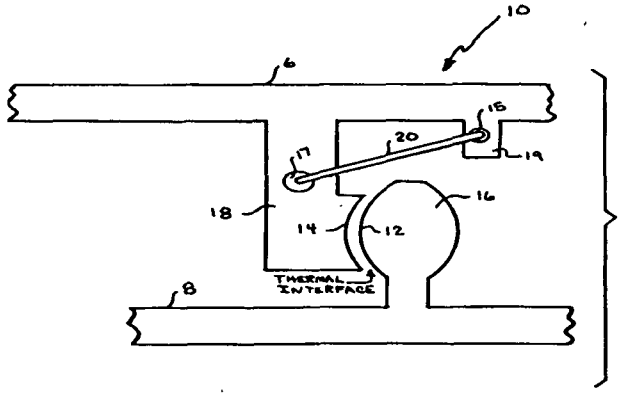
COUPLING DEVICE WITH IMPROVED THERMAL INTERFACE Patent Application

M. BRUCE MILAM, inventor (to NASA) 13 Jun. 1991 23 p (NASA-CASE-GSC-13251-1; NAS 1.71:GSC-13251-1; US-PATENT-APPL-SN-714814) Avail: NTIS HC/MF A03 CSCL 13K

The primary object of the present invention is to provide a simple, reliable, and lightweight coupling that will also have an efficient thermal interface. A further object of the invention is to provide a coupling that is capable of blind mate with little or no insertion forces. Another object of the invention is to provide a coupling that acts as a thermal regulator to maintain a constant temperature on one side of the coupling. A still further object of the invention is to increase the available surface area of a coupling thus providing a larger area for the conduction of heat across the thermal interface. Another object of the invention is to provide a

fluidic coupling that has no fluid passing across the interface, thus reducing the likelihood of leaks and contamination. The foregoing objects are achieved by utilizing, as in the prior art, a hot area (at an elevated temperature as compared to a cold area) with a need to remove excess heat from the hot area to a cold area. In this device, the thermal interface will occur not on a planar horizontal surface, but along a non-planar vertical surface, which will reduce the reaction forces and increase the thermal conductivity of the device. One non-planar surface is a surface on a cold pin extending from the cold area and the other non-planar surface is a surface on a hot pin extending from the hot area. The cold pin is fixed and does not move while the hot pin is a flexible member and its movement towards the cold pin will bring the two non-planar surfaces together forming the thermal interface. The actuating member for my device is a shape-memory actuation wire which is attached through an aperture to the hot pin and through another aperture to an actuation wire retainer. By properly programming the actuation wire, heat from the hot area will cause the actuation wire to bend the hot wire heat from the hot area will cause the actuation wire to bend the hot pin towards the cold pin forming the coupling and desired thermal interface. The shape-memory actuation wire is made of a shape-memory-effect alloy such as Nitinol.

NASA



N91-31655* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
POWER SAW Patent
JIMMY D. BRADLEY, inventor (to NASA) 13 Aug. 1991
10 p Filed 28 Feb. 1990 Supersedes N90-26340 (28 - 20, p 2872)
(NASA-CASE-MSC-21469-1; US-PATENT-5,038,473; US-PATENT-APPL-SN-486458; US-PATENT-CLASS-30-92; US-PATENT-CLASS-30-388; INT-PATENT-CLASS-B23D-21/06; INT-PATENT-CLASS-B26B-27/00; INT-PATENT-CLASS-B26D-3/16) Avail: US Patent and Trademark Office CSCL 13I

A power saw is disclosed for space or robotic operations with jaw members for clamping to a work piece by an operation of a lever arm. The saw assembly is slidably mounted on the jaw assembly and fed into the work piece by a hand operated feed screw. The saw assembly includes a motor and gear belt. A current sensing circuit provides a current signal which actuates colored lights to visually depict the load on the saw blade during the cutting operations.

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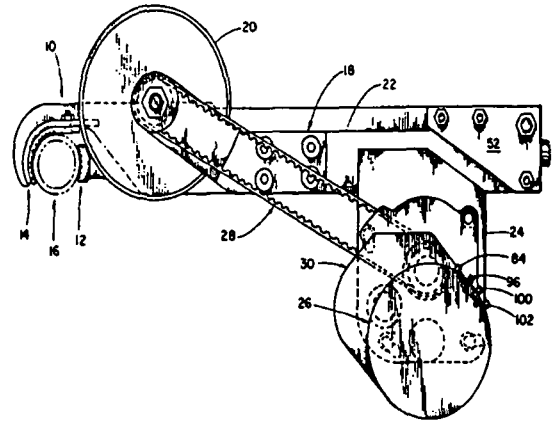

N91-31656* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
ROBOTIC TOOL CHANGE MECHANISM Patent
GEORGE M. VOELLMER, inventor (to NASA) 3 Sep. 1991 9 p Filed 2 Nov. 1990 Supersedes N91-15556 (29 - 7, p 1012)
(NASA-CASE-GSC-13239-1; US-PATENT-5,044,063; US-PATENT-APPL-SN-608657; US-PATENT-CLASS-29-568; US-PATENT-CLASS-294-86.4; US-PATENT-CLASS-901-30; INT-PATENT-CLASS-B23Q-3/155) Avail: US Patent and Trademark Office CSCL 13I

An assembly of three major components is disclosed which included a wrist interface plate which is secured to the wrist joint of a robotic arm, a tool interface plate which is secured to each tool intended for use by the robotic arm, and a tool holster for each tool attached to the interface plate. The wrist interface plate and a selected tool interface plate are mutually connectable together through an opening or recess in the upper face of the interface plate by means of a notched tongue protruding from the front face of the wrist interface plate which engages a pair of spring-biased rotatable notched wheels located within the body of the tool interface plate. The tool holster captures and locks onto the tool interface plate by means of a pair of actuation claws including a locking tab and an unlocking wedge which operate respective actuation bosses on each of the notched wheels in response to a forward and backward motion of the tool interface plate as a result of motion of the robotic arm to either park the tool or use the tool.

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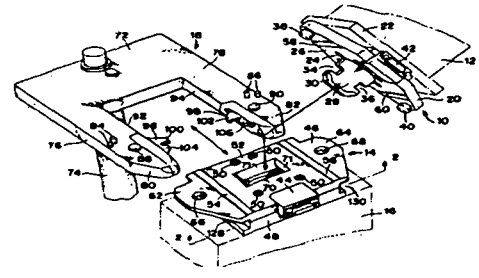

N91-32498* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
TWO FAULT TOLERANT TOGGLE-HOOK RELEASE Patent
THOMAS JOSEPH GRAVES, inventor (to NASA) and CHRISTOPHER WILLIAM BROWN, inventor (to NASA) 10 Sep. 1991 12 p Filed 25 Oct. 1990 Supersedes N91-13723 (29 - 5, p 670)
(NASA-CASE-MSC-21671-1; US-PATENT-5,046,395; US-PATENT-APPL-SN-603337; US-PATENT-CLASS-89-1.14; US-PATENT-CLASS-89-1.57; US-PATENT-CLASS-102-378; US-PATENT-CLASS-294-82.26; INT-PATENT-CLASS-B64D-1/12)
Avail: US Patent and Trademark Office CSCL 13I

A coupling device is disclosed which is mechanically two fault tolerant for release. The device comprises a fastener plate and fastener body, each of which is attachable to a different one of a pair of structures to be joined. The fastener plate and body are coupled by an elongate toggle mounted at one end in a socket on the fastener plate for universal pivotal movement thereon. The other end of the toggle is received in an opening in the fastener body and adapted for limited pivotal movement therein. The toggle is adapted to be restrained by three latch hooks arranged in symmetrical equiangular spacing about the axis of the toggle, each hook being mounted on the fastener body for pivotal movement between an unlatching non-contact position with respect to the toggle and a latching position in engagement with a latching surface of the toggle. The device includes releasable lock means for locking each latch hook in its latching position whereby the toggle couples the fastener plate to the fastener body and means for releasing the lock means to unlock each said latch hook from the latch position whereby the unlocking of at least one of the latch hooks from its latching position results in the decoupling of the fastener plate from the fastener body.

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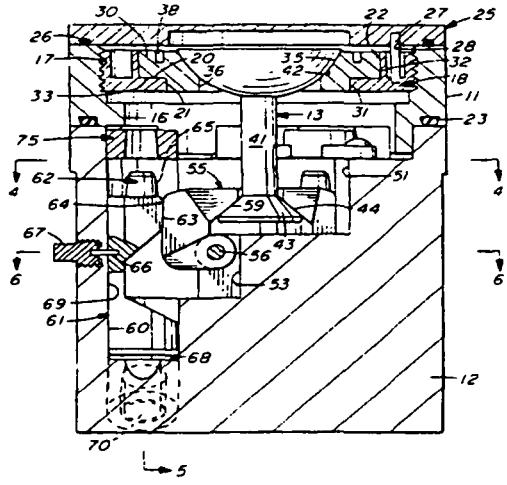

N91-32508* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
NOZZLE FABRICATION TECHNIQUE Patent
DENNIS L. WELLS, inventor (to NASA) 24 Sep. 1991 9 p Filed 26 May 1989 Division of US-Patent-Appl-SN-176587, filed 1 Apr. 1988
(NASA-CASE-MSC-21299-2; US-PATENT-5,051,559; US-PATENT-APPL-SN-358029; US-PATENT-APPL-SN-176587; US-PATENT-CLASS-219-121.72; US-PATENT-CLASS-29-558; US-PATENT-CLASS-219-69.12; INT-PATENT-CLASS-B23K-26/00)
Avail: US Patent and Trademark Office CSCL 13H

A block of electrically conductive material which is to be formed into a body with internal and/or external surfaces that approximate hyperboloids of one sheet is placed so that its axis is set at a predetermined skew angle with relation to a traveling EDM electrode wire. The electrode wire is then moved into cutting proximity of the body wire. Thereafter, by revolving the body about its own axis, the external and/or internal surfaces of the body will be cut into an approximate hyperbolic surface of revolution depending upon whether the body is positioned with the cutting wire outside of the body or in a previously formed longitudinal passage in the body. As an alternative technique, elongated channels can also be cut into the wall of the body by successively orienting the body to a selected number of angular positions, with the electrode wire being either outside of the body or in a previously formed passage in the body. At each of these angular positions, the electrode wire is moved orthogonally with respect to the axis of the wire, while both the body axis skew angle and the rotational position about that axis is controlled by cutting a channel or groove in the body to relieve stresses in the body material or to convey a coolant fluid.

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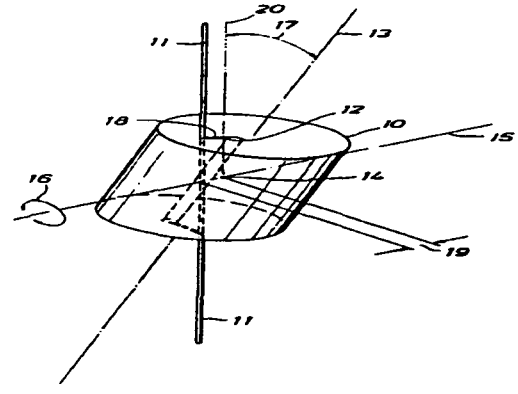
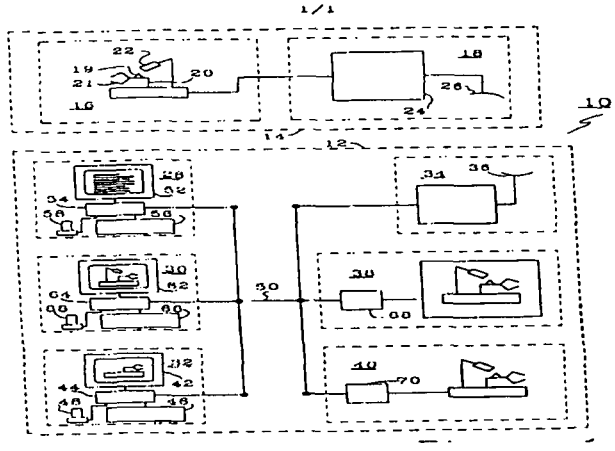


N91-32509*# National Aeronautics and Space Administration. Pasadena Office, CA.
TELEROBOT CONTROL SYSTEM Patent Application
PAUL G. BACKES, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 May 1991 29 p (Contract NAS7-918)
(NASA-CASE-NPO-18116-1-CU; NAS 1.71:NPO-18116-1-CU; US-PATENT-APPL-SN-699299) Avail: NTIS HC/MF A03 CSCL 13I

This invention relates to an operator interface for controlling a telerobot to perform tasks in a poorly modeled environment and/or within unplanned scenarios. The telerobot control system includes a remote robot manipulator linked to an operator interface. The operator interface includes a setup terminal, simulation terminal, and execution terminal for the control of the the graphics simulator and local robot actuator as well as the remote robot actuator. These terminals may be combined in a single terminal. Complex tasks are developed from sequential combinations of parameterized task primitives and recorded teleoperations, and are tested by execution on a graphics simulator and/or local robot actuator, together with adjustable time delays. The novel features of this invention include the shared and supervisory control of the remote robot manipulator via operator

interface by pretested complex tasks sequences based on sequences of parameterized task primitives combined with further teleoperation and run-time binding of parameters based on task context.

NASA



N91-32510*# National Aeronautics and Space Administration. Pasadena Office, CA.

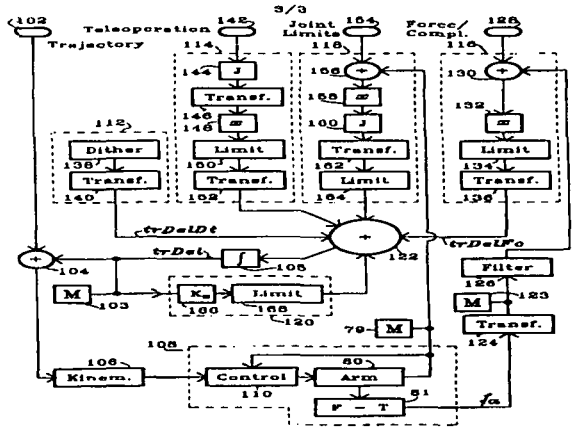
A GENERALIZED COMPLIANT MOTION PRIMITIVE Patent Application

PAUL G. BACKES, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Aug. 1991 53 p (Contract NAS7-918)

(NASA-CASE-NPO-18134-1-CU; NAS 1.71:NPO-18134-1-CU; US-PATENT-APPL-SN-744118) Avail: NTIS HC/MF A04 CSCL 13I

This invention relates to a general primitive for controlling a telerobot with a set of input parameters. The primitive includes a trajectory generator; a teleoperation sensor; a joint limit generator; a force setpoint generator; a dither function generator, which produces telerobot motion inputs in a common coordinate frame for simultaneous combination in sensor summers. Virtual return spring motion input is provided by a restoration spring subsystem. The novel features of this invention include use of a single general motion primitive at a remote site to permit the shared and supervisory control of the robot manipulator to perform tasks via a remotely transferred input parameter set.

NASA



N91-32511*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

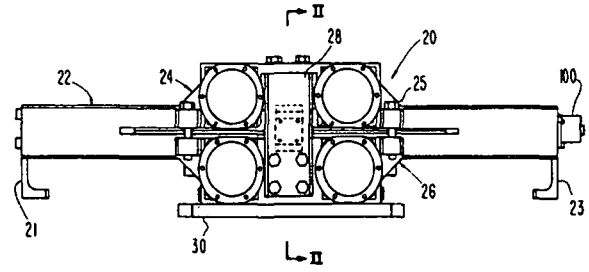
LINEAR MASS ACTUATOR Patent Application

SIDNEY E. HOLLOWAY, III, inventor (to NASA), EDWARD A. CROSSLEY, inventor (to NASA), IRBY W. JONES, inventor (to NASA), JAMES B. MILLER, inventor (to NASA), C. CALVIN DAVIS, inventor (to NASA), VAUGHN D. BEHUN, inventor (to NASA), and LEWIS R. GOODRICH, SR., inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) 22 Jul. 1991 20 p

(NASA-CASE-LAR-14352-1; NAS 1.71:LAR-14352-1; US-PATENT-APPL-SN-735149) Avail: NTIS HC/MF A03 CSCL 20K

A linear mass actuator includes an upper housing and a lower housing connectable to each other and having a central passageway passing axially therethrough a mass linearly movable in the central passageway. Rollers mounted in the upper and lower housings and being in frictional engagement with the mass, translates the mass linearly in the central passageway and drive motors operatively coupled to the roller means, for rotating the rollers and thus driving the mass axially in the central passageway.

NASA



N91-32514* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

BIDIRECTIONAL DRIVE AND BRAKE MECHANISM Patent

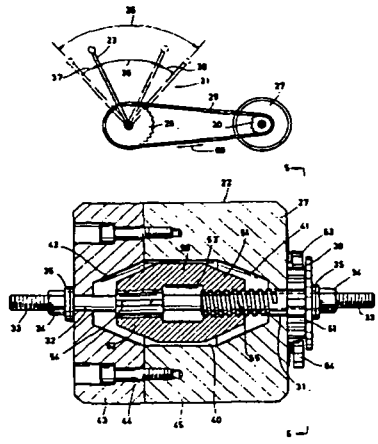
SCOTT A. SWAN, inventor (to NASA) 22 Oct. 1991 19 p Filed 23 May 1990 Supersedes N90-26342 (28 - 20, p 2872)

(NASA-CASE-MSC-21540-1; US-PATENT-5,058,506; US-PATENT-APPL-SN-527508; US-PATENT-CLASS-105-87; US-PATENT-CLASS-105-141; US-PATENT-CLASS-105-142; US-PATENT-CLASS-105-124; US-PATENT-CLASS-188-24.11; INT-PATENT-CLASS-B61D-15/08) Avail: US Patent and Trademark Office CSCL 13I

A space transport vehicle is disclosed as including a body which is arranged to be movably mounted on an elongated guide member disposed in outer space and driven therealong. A drive wheel is mounted on a drive shaft and arranged to be positioned in rolling engagement with the elongated guide carrying the vehicle. A brake member is arranged on the drive shaft for movement into and out of engagement with an adjacent surface of the drive wheel. An actuator is mounted on the body to be manually moved back and forth between spaced positions in an

arc of movement. A ratchet-and-pawl mechanism is arranged to operate upon movements of the actuator in one direction between first and second positions for coupling the actuator to the drive wheel to incrementally rotate the wheel in one rotational direction and to operate upon movements of the actuator in the opposite direction for uncoupling the actuator from the wheel. The brake member is threadedly coupled to the drive shaft in order that the brake member will be operated only when the actuator is moved on beyond its first and second positions for shifting the brake member along the drive shaft and into frictional engagement with the adjacent surface on the drive wheel.

Official Gazette of the U.S. Patent and Trademark Office



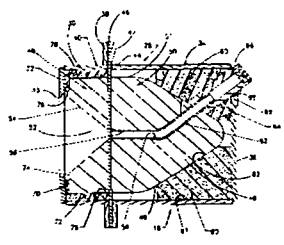
38
QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N91-32515*# National Aeronautics and Space Administration. John C. Stennis Space Center, Bay Saint Louis, MS.
GAMMA RAY COLLIMATOR Patent Application
EDGAR J. CASANOVA, inventor (to NASA) (Sverdrup Technology, Inc., Bay Saint Louis, MS.) 6 Aug. 1991 18 p
(NASA-CASE-SSC-00013-1; NAS 1.71:SSC-00013-1; US-PATENT-APPL-SN-740675) Avail: NTIS HC/MF A03 CSCL 14D

A gamma ray collimator including a housing having first and second sections is disclosed. The first section encloses a first section of depleted uranium which is disposed for receiving and supporting a radiation emitting component such as cobalt 60. The second section encloses a depleted uranium member which is provided with a conical cut out focusing portion disposed in communication with the radiation emitting element for focusing the emitted radiation to the target.

NASA



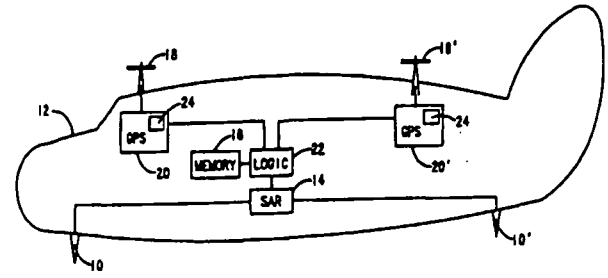
43
EARTH RESOURCES AND REMOTE SENSING

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

N91-21621* National Aeronautics and Space Administration. Pasadena Office, CA.
SYSTEM AND METHOD FOR MEASURING OCEAN SURFACE CURRENTS AT LOCATIONS REMOTE FROM LAND MASSES USING SYNTHETIC APERTURE RADAR Patent
LAWRENCE E. YOUNG, inventor (to NASA) 5 Feb. 1991
7 p Filed 14 Mar. 1990 Supersedes N91-13787 (29 - 5, p 681)
(Contract NAS7-918)
(NASA-CASE-NPO-17937-1-CU; US-PATENT-4,990,922; US-PATENT-APPL-SN-493190; US-PATENT-CLASS-342-52; US-PATENT-CLASS-342-26; US-PATENT-CLASS-342-357; INT-PATENT-CLASS-G01S-13/86; INT-PATENT-CLASS-G01S-13/89) Avail: US Patent and Trademark Office CSCL 08C

A system for measuring ocean surface currents from an airborne platform is disclosed. A radar system having two spaced antennas wherein one antenna is driven and return signals from the ocean surface are detected by both antennas is employed to get raw ocean current data which are saved for later processing. There are a pair of global positioning system (GPS) systems including a first antenna carried by the platform at a first location and a second antenna carried by the platform at a second location displaced from the first antenna for determining the position of the antennas from signals from orbiting GPS navigational satellites. Data are also saved for later processing. The saved data are subsequently processed by a ground-based computer system to determine the position, orientation, and velocity of the platform as well as to derive measurements of currents on the ocean surface.

Official Gazette of the U.S. Patent and Trademark Office



N91-32546* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
GENERATION OF TOPOGRAPHIC TERRAIN MODELS UTILIZING SYNTHETIC APERTURE RADAR AND SURFACE LEVEL DATA Patent
MARC L. IMHOFF, inventor (to NASA) 1 Oct. 1991 14 p
Filed 10 Aug. 1989
(NASA-CASE-GSC-13212-1; US-PATENT-5,053,778; US-PATENT-APPL-SN-391896; US-PATENT-CLASS-342-191; US-PATENT-CLASS-342-25; US-PATENT-CLASS-342-26; INT-PATENT-CLASS-G01S-13/89) Avail: US Patent and Trademark Office CSCL 08B

Topographical terrain models are generated by digitally delineating the boundary of the region under investigation from

the data obtained from an airborne synthetic aperture radar image and surface elevation data concurrently acquired either from an airborne instrument or at ground level. A set of coregistered boundary maps thus generated are then digitally combined in three dimensional space with the acquired surface elevation data by means of image processing software stored in a digital computer. The method is particularly applicable for generating terrain models of flooded regions covered entirely or in part by foliage.

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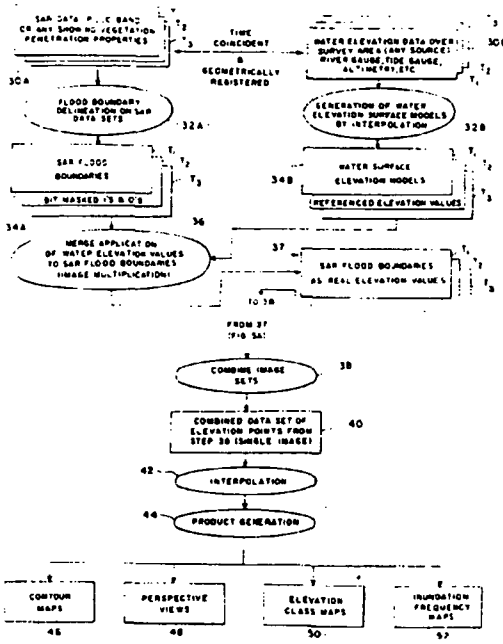


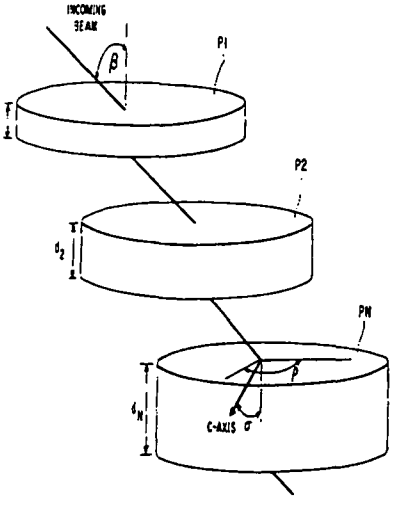
44
ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.

N91-23617*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
SOLAR THERMAL ENERGY RECEIVER Patent Application
KARL W. BAKER, inventor (to NASA) and MILES O. DUSTIN, inventor (to NASA) 27 Mar. 1991 14 p
(NASA-CASE-LEW-14949-1; NAS 1.71:LEW-14949-1; US-PATENT-APPL-SN-676910) Avail: NTIS HC/MF A03 CSCL 10A

A plurality of heat pipes in a shell receive concentrated solar energy and transfer the energy to a heat activated system. To provide for even distribution of the energy despite uneven impingement of solar energy on the heat pipes, absence of solar energy at times, or failure of one or more of the heat pipes, energy storage means are disposed on the heat pipes which extend through a heat pipe thermal coupling means into the heat activated device. To enhance energy transfer to the heat activated device, the heat pipe coupling cavity means may be provided with extensions into the device. For use with a Stirling engine having passages for working gas, heat transfer members may be positioned to contact the gas and the heat pipes. The shell may be divided into sections by transverse walls. To prevent cavity working fluid from collecting in the extensions, a porous body is positioned in the cavity.

NASA



N91-27614* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
THIN SOLAR CELL AND LIGHTWEIGHT ARRAY Patent
HENRY W. BRANDHORST, JR., inventor (to NASA) and IRVING WEINBERG, inventor (to NASA) 28 May 1991 14 p Filed 20 Mar. 1990
(NASA-CASE-LEW-14959-1; US-PATENT-5,019,176; US-PATENT-APPL-SN-495969; US-PATENT-CLASS-136-244; US-PATENT-CLASS-136-249; US-PATENT-CLASS-136-256; US-PATENT-CLASS-357-30; US-PATENT-CLASS-437-2; INT-PATENT-CLASS-H01L-31/42; INT-PATENT-CLASS-H01L-31/18) Avail: US Patent and Trademark Office CSCL 10A

A thin, lightweight solar cell that utilizes front contact metallization is presented. Both the front light receiving surface of the solar cell and the facing surface of the cover glass are recessed to accommodate this metallization. This enables the two surfaces to meet flush for an optimum seal.

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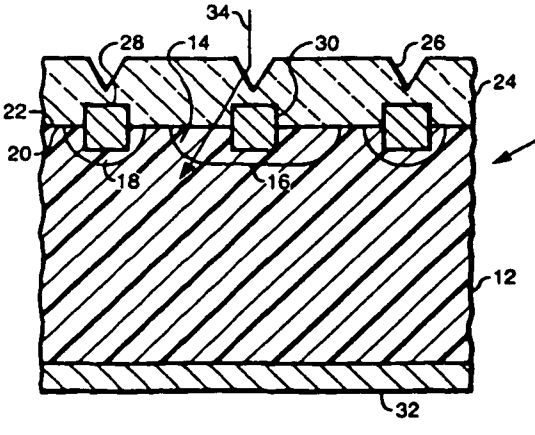


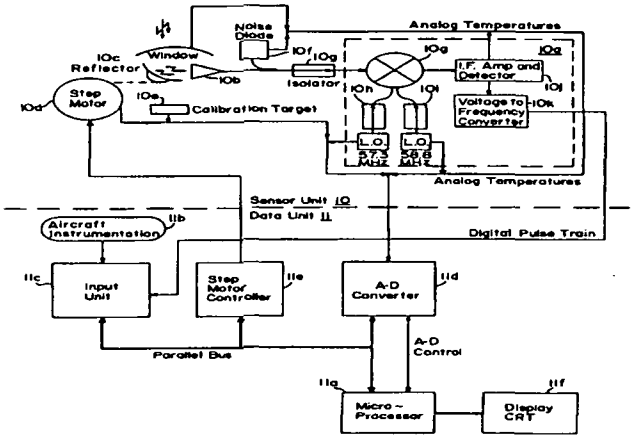
47
METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N91-23662*# National Aeronautics and Space Administration. *Pasadena Office, CA.*
MICROWAVE TEMPERATURE PROFILER FOR CLEAR AIR TURBULENCE PREDICTION Patent Application
BRUCE L. GARY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 27 Nov. 1990 33 p
(Contract NAS7-918)
(NASA-CASE-NPO-18115-1-CU; NAS 1.71:NPO-18115-1-CU; US-PATENT-APPL-SN-618790) Avail: NTIS HC/MF A03 CSCL 04B

A method is disclosed for determining Richardson Number, Ri, or its reciprocal, RRi, for clear air prediction using measured potential temperature and determining the vertical gradient of potential temperature, d(theta)/dz. Wind vector from the aircraft instrumentation versus potential temperature, dW/D(theta), is determined and multiplies by d(theta)/dz to obtain dW/dz. Richardson number or its reciprocal is then determined from the relationship Ri = K(d(theta)/dz divided (dW/dz)squared) for use in detecting a trend toward a threshold value for the purpose of predicting clear air turbulence. Other equations for this basic relationship are disclosed together with the combination of other atmospheric observables using multiple regression techniques.

NASA



51
LIFE SCIENCES (GENERAL)

N91-21700* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
ROTATING BIO-REACTOR CELL CULTURE APPARATUS Patent
RAY P. SCHWARZ, inventor (to NASA) and DAVID A. WOLF, inventor (to NASA) 29 Jan. 1991 10 p Filed 30 Jun. 1988 Supersedes N89-14666 (27 - 6, p 803)
(NASA-CASE-MSC-21293-1; US-PATENT-4,988,623; US-PATENT-APPL-SN-213559; US-PATENT-CLASS-435-286; US-PATENT-CLASS-435-284; US-PATENT-CLASS-435-285; US-PATENT-CLASS-435-292; US-PATENT-CLASS-435-311; US-PATENT-CLASS-435-312; US-PATENT-CLASS-435-316)
Avail: US Patent and Trademark Office CSCL 06C

A bioreactor system is described in which a tubular housing contains an internal circularly disposed set of blade members and a central tubular filter all mounted for rotation about a common horizontal axis and each having independent rotational support and rotational drive mechanisms. The housing, blade members and filter preferably are driven at a constant slow speed for placing a fluid culture medium with discrete microbeads and cell cultures in a discrete spatial suspension in the housing. Replacement fluid medium is symmetrically input and fluid medium is symmetrically output from the housing where the input and the output are part of a loop providing a constant or intermittent flow of fluid medium in a closed loop.

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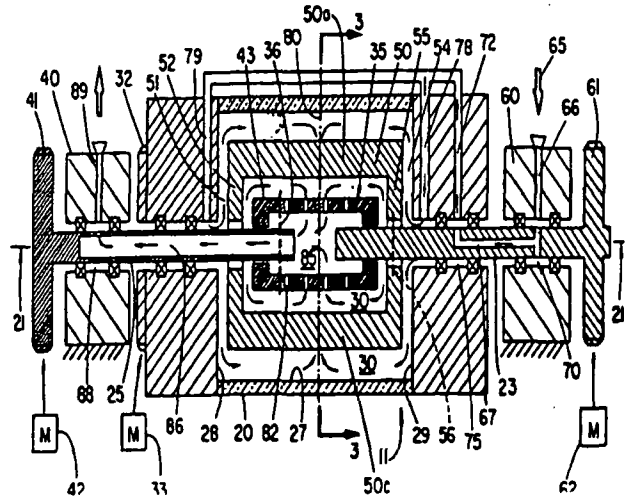

N91-21701* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
SPIRAL VANE BIOREACTOR Patent
DENNIS R. MORRISON, inventor (to NASA) 26 Mar. 1991 14 p Filed 29 Nov.1988 Supersedes N89-25557 (27 - 19, p 2739)
Sponsored by NASA. Johnson Space Center
(NASA-CASE-MSC-21361-1; US-PATENT-5,002,890; US-PATENT-APPL-SN-278137; US-PATENT-CLASS-435-286; US-PATENT-CLASS-435-289; US-PATENT-CLASS-435-311; US-PATENT-CLASS-435-315; US-PATENT-CLASS-435-316; US-PATENT-CLASS-210-396; INT-PATENT-CLASS-C12M-03/06)
Avail: US Patent and Trademark Office CSCL 06C

A spiral vane bioreactor of a perfusion type is described in which a vertical chamber, intended for use in a microgravity condition, has a central rotating filter assembly and has flexible membranes disposed to rotate annularly about the filter assembly. The flexible members have end portions disposed angularly with respect to one another. A fluid replenishment medium is input from a closed loop liquid system to a completely liquid filled chamber containing microcarrier beads, cells and a fluid medium. Output of spent medium is to the closed loop. In the closed loop, the output and input parameters are sensed by sensors. A manifold

permits recharging of the nutrients and pH adjustment. Oxygen is supplied and carbon dioxide and bubbles are removed and the system is monitored and controlled by a microprocessor.

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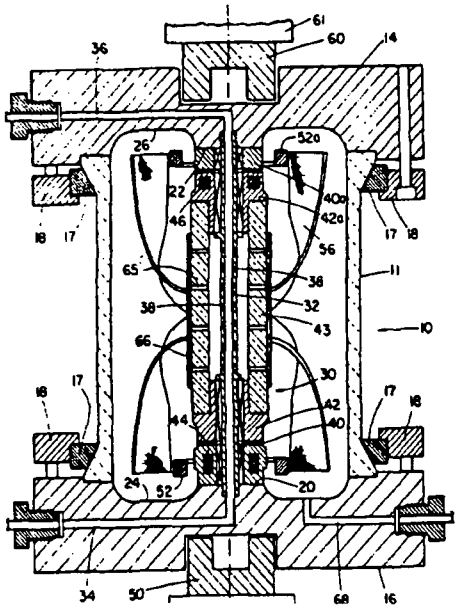


N91-25570*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

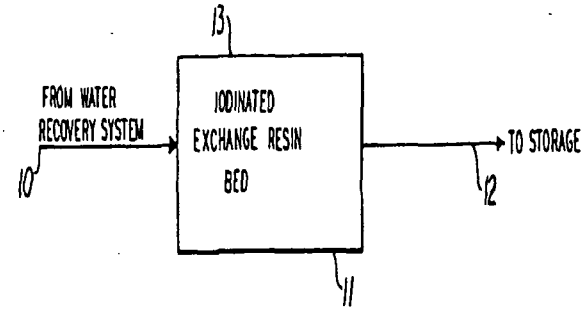
REGENERABLE BIOCIDE DELIVERY UNIT Patent Application

GERALD V. COLOMBO, inventor (to NASA), CLIFFORD D. JOLLY, inventor (to NASA) (Umpqua Research Co., Myrtle Creek, OR.), and RICHARD L. SAUER, inventor (to NASA) 18 Mar. 1991 18 p

(NASA-CASE-MSC-21763-1; NAS 1.71:MSC-21763-1; US-PATENT-APPL-SN-671603) Avail: NTIS HC/MF A03 CSCL 06K

A method and apparatus are disclosed for maintaining continuous, long-term microbial control in the water supply for potable, hygiene, and experimental water for space activities, as well as treatment of water supplies on Earth. The water purification is accomplished by introduction of molecular iodine into the water supply to impart a desired iodine residual. The water is passed through an iodinated anion exchange resin bed. The iodine is bound as I(sub n) at the anion exchange sites and releases I(sub 2) into the water stream flowing through the bed. The concentration of I(sub 2) in the flowing water gradually decreases and, in the prior art, the ion-exchange bed has had to be replaced. In a preferred embodiment, a bed of iodine crystals is provided with connections for flowing water therethrough to produce a concentrated (substantially saturated) aqueous iodine solution which is passed through the iodinated resin bed to recharge the bed with bound iodine. The bed of iodine crystals is connected in parallel with the iodinated resin bed and is activated periodically (e.g., by timer, by measured flow of water, or by iodine residual level) to recharge the bed. Novelty resides in the capability of inexpensively and repeatedly regenerating the ion-exchange bed in situ.

NASA



N91-30667* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

HORIZONTALLY ROTATED CELL CULTURE SYSTEM WITH A COAXIAL TUBULAR OXYGENATOR Patent

DAVID A. WOLF, inventor (to NASA), RAY P. SCHWARZ, inventor (to NASA), and TINH T. TRINH, inventor (to NASA) (Krug International, Houston, TX.) 25 Jun. 1991 17 p Filed 30 Jun. 1988 Supersedes N89-13131 (27 - 4, p 537)

(NASA-CASE-MSC-21294-1; US-PATENT-5,026,650; US-PATENT-APPL-SN-213558; US-PATENT-CLASS-435-286; US-PATENT-CLASS-435-285; US-PATENT-CLASS-435-312; US-PATENT-CLASS-435-313; US-PATENT-CLASS-435-818; US-PATENT-CLASS-261-83; INT-PATENT-CLASS-C12M-3/02) Avail: US Patent and Trademark Office CSCL 06C

The present invention relates to a horizontally rotating bioreactor useful for carrying out cell and tissue culture. For processing of mammalian cells, the system is sterilized and fresh fluid medium, microcarrier beads, and cells are admitted to completely fill the cell culture vessel. An oxygen containing gas is admitted to the interior of the permeable membrane which prevents air bubbles from being introduced into the medium. The cylinder is rotated at a low speed within an incubator so that the circular motion of the fluid medium uniformly suspends the microbeads throughout the cylinder during the cell growth period. The unique design of this cell and tissue culture device was initially driven by two requirements imposed by its intended use for feasibility studies for three dimensional culture of living cells and tissues in space by JSC. They were compatible with microgravity and simulation of microgravity in one G. The vessels are designed to approximate the extremely quiescent low shear environment obtainable in space.

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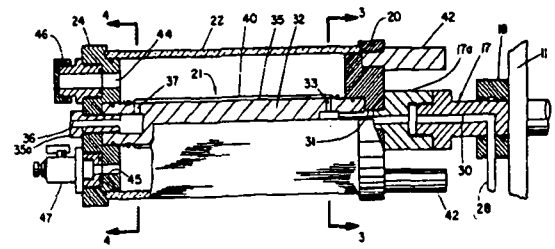

N91-31755* ***National Aeronautics and Space Administration.*** **Lyndon B. Johnson Space Center, Houston, TX.**
BIOFILM MONITORING COUPON SYSTEM AND METHOD OF USE Patent
RICHARD L. SAUER, inventor (to NASA) and DAVID T. FLANAGAN, inventor (to NASA) 17 Sep. 1991 10 p Filed 14 Mar. 1990 supersedes N91-13857 (29 - 5, p 693)
(NASA-CASE-MSC-21585-1; US-PATENT-5,049,492; US-PATENT-APPL-SN-493529; US-PATENT-CLASS-435-30; US-PATENT-CLASS-73-863.85; US-PATENT-CLASS-73-863.86; US-PATENT-CLASS-73-863.41; US-PATENT-CLASS-73-863.22; US-PATENT-CLASS-422-99; US-PATENT-CLASS-422-101)
Avail: US Patent and Trademark Office CSCL 06C

An apparatus and method is disclosed for biofilm monitoring of a water distribution system which includes the mounting of at least one fitting in a wall port of a manifold in the water distribution system with a passage through the fitting in communication. The insertion of a biofilm sampling member is through the fitting with planar sampling surfaces of different surface. treatment provided on linearly arrayed sample coupons of the sampling member disposed in the flow stream in edge-on parallel relation to the direction of the flow stream of the manifold under fluid-tight sealed conditions. The sampling member is adapted to be aseptically removed from or inserted in the fitting and manifold under a positive pressure condition and the fitting passage sealed immediately thereafter by appropriate closure means so as to preclude contamination of the water distribution system through the fitting. The apparatus includes means for clamping the sampling member and for establishing electrical continuity between the sampling surfaces and the system for minimizing electropotential effects. The apparatus may also include a plurality of fittings and sampling members mounted on the manifold to permit extraction of the sampling members in a timed sequence throughout the monitoring period.

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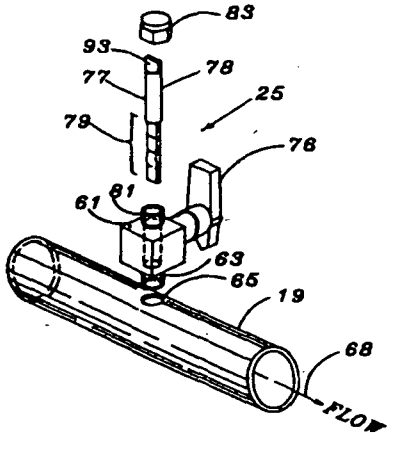


52

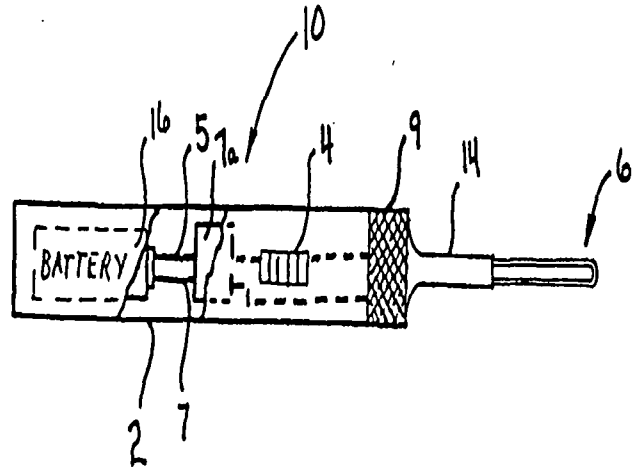
AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

N91-28727*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
DEVICE FOR REMOVING FOREIGN OBJECTS FROM ANATOMIC ORGANS Patent Application
EARL D. ANGULO, inventor (to NASA) 19 Mar. 1991 18 p
(NASA-CASE-GSC-13306-1; NAS 1.71:GSC-13306-1; US-PATENT-APPL-SN-674828) Avail: NTIS HC/MF A03 CSCL 06K

A device is disclosed for removing foreign objects from anatomic organs such as the ear canal or throat. It has a housing shaped like a flashlight, an electrical power source such as a battery or AC power from a wall socket, and a tip extending from the housing. The tip has at least one wire loop made from a shape-memory-effect alloy such as Nitinol switchably connected to the electrical power source such that when electric current flows through the wire loop the wire loop heats up and returns to a previously programmed shape such as a curet or tweezers so as to facilitate removal of the foreign object.

NASA

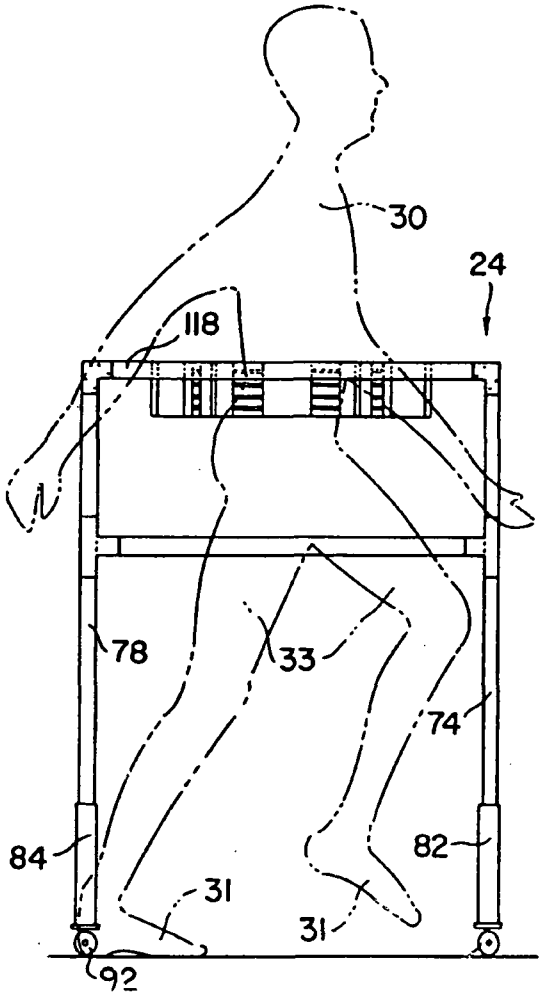


N91-29714*# National Aeronautics and Space Administration. *Goddard Space Flight Center, Greenbelt, MD.*
COMPLIANT WALKER Patent Application
JAMES J. KERLEY, inventor (to NASA), WAYNE EKLUND, inventor (to NASA), and J. ALLEN CRANE, inventor (to NASA) (*NSI, Inc., Greenbelt, MD.*) 3 Jul. 1991 21 p
(NASA-CASE-GSC-13348-2; NAS 1.71:GSC-13348-2; US-PATENT-APPL-SN-725111) Avail: NTIS HC/MF A03 CSCL 06L

A compliant walker is provided for humans having limited use of their legs and lower back. It includes an upright wheel frame which at least partially surrounds an upright user wearing a partial body harness. It is attached to the frame by means of cable compliant apparatus consisting of sets of cable segments and angle bracket members connected between opposite side members of the frame and adjacent side portions of the harness. Novelty is believed to exist in the combination of a wheeled frame including a side support structure, a body harness, and compliance means connecting the body harness to the side support structure

for flexibility holding and supporting a person in a substantially upright position when the user sags in the frame when taking weight off the lower extremities.

NASA



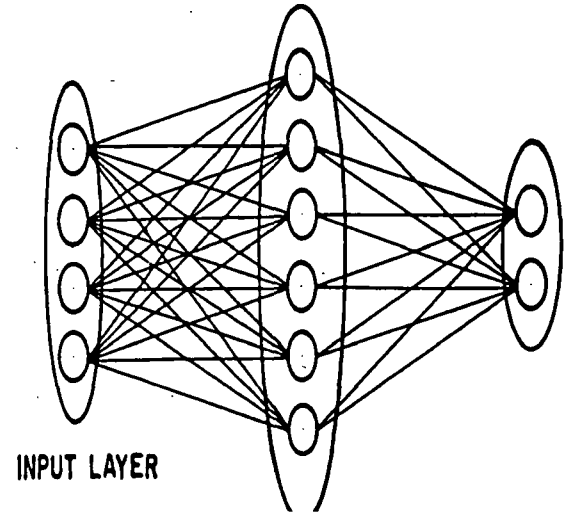
53
BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N91-28730*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
AN ACCELERATED TRAINING METHOD FOR BACK PROPAGATION NETWORKS Patent Application
ROBERT O. SHELTON, inventor (to NASA) 17 Jun. 1991
42 p
(NASA-CASE-MSC-21625-1; NAS 1.71:MSC-21625-1; US-PATENT-APPL-SN-716182) Avail: NTIS HC/MF A03 CSCL 05I

The principal objective is to provide a training procedure for a feed forward, back propagation neural network which greatly accelerates the training process. A set of orthogonal singular vectors are determined from the input matrix such that the standard deviations of the projections of the input vectors along these singular vectors, as a set, are substantially maximized, thus providing an optimal means of presenting the input data. Novelty exists in the method of extracting from the set of input data, a set of features which can serve to represent the input data in a simplified manner, thus greatly reducing the time/expense to training the system.

NASA



54
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N91-26747* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METHOD AND APPARATUS FOR WASTE COLLECTION AND STORAGE Patent
WILLIAM E. THORNTON, JR., inventor (to NASA) and HENRY B. WHITEMORE, inventor (to NASA) 9 Apr. 1991
15 p Filed 10 Aug. 1989 Division of US-Patent-Appl-SN-035401, filed 7 Apr. 1987
(NASA-CASE-MSC-21025-3; US-PATENT-5,005,457; US-PATENT-APPL-SN-392174; US-PATENT-APPL-SN-035401; US-PATENT-CLASS-83-206; US-PATENT-CLASS-83-203;

US-PATENT-CLASS-83-277; US-PATENT-CLASS-83-282; US-PATENT-CLASS-83-614; US-PATENT-CLASS-83-649) Avail: US Patent and Trademark Office CSCL 06K

A method and apparatus are disclosed for collection of fecal matter designed to operate efficiently in zero gravity environment. The system comprises a waste collection area within a body having a seat opening. Low pressure within a waste collection area directs fecal matter away from the user's buttocks and prevents the escape of undesirable gases. The user actuates a piston covered with an absorbent pad that sweeps through the waste collection area, press the waste against an end of the waste collection area and retracts, leaving the used pad. Multiple pads are provided on the piston to accommodate multiple uses of the system. Also a valve allows air to be drawn through the body, which valve will not be plugged with fecal matter. A sheet feeder feeds fresh sheets of absorbent pad to a face of the piston with each actuation.

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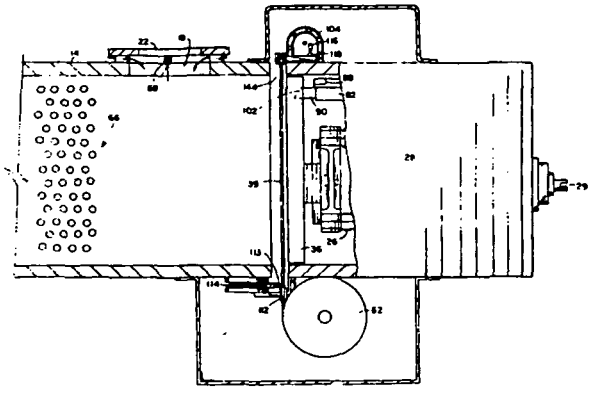

N91-31803*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

METHOD AND APPARATUS FOR BIO-REGENERATIVE LIFE SUPPORT SYSTEM Patent

HATICE S. CULLINGFORD, inventor (to NASA) 9 Apr. 1991 13 p Filed 11 Jul. 1989 Supersedes N89-29027 (27 - 23, p 3335)

(NASA-CASE-MSC-21629-1; US-PATENT-5,005,787; US-PATENT-APPL-SN-378548; US-PATENT-CLASS-244-163; US-PATENT-CLASS-244-159; US-PATENT-CLASS-47-1.4; US-PATENT-CLASS-47-62; US-PATENT-CLASS-55-75; US-PATENT-CLASS-210-748; INT-PATENT-CLASS-B64G-1/46) Avail: US Patent and Trademark Office CSCL 06K

A life support system is disclosed for human habitation (cabin) which has a bioregenerative capability through the use of a plant habitat (greenhouse) whereby oxygen-rich air from the greenhouse is processed and used in the cabin and carbon dioxide-rich air from the cabin is used in the greenhouse. Moisture from the air of both cabin and greenhouse is processed and reused in both. Wash water from the cabin is processed and reused in the cabin as hygiene water, and urine from the cabin is processed and used in the greenhouse. Spent water from the greenhouse is processed and reused in the greenhouse. Portions of the processing cycles are separated between cabin and greenhouse in order to reduce to a minimum cross contamination of the two habitat systems. Other portions of the processing cycles are common to both cabin and greenhouse. The use of bioregenerative techniques permits a substantial reduction of the total consumables used by the life support system.

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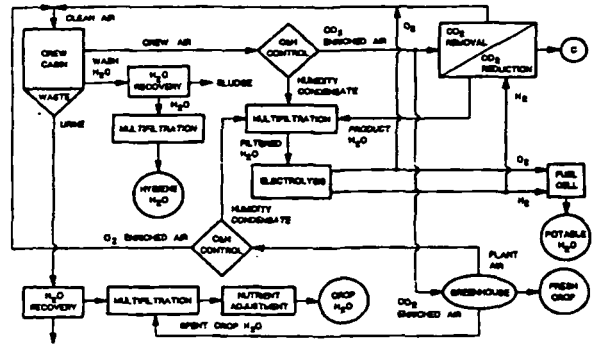

N91-32795* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

ROTATIONALLY ACTUATED PROSTHETIC HELPING HAND Patent

WILLIAM E. NORTON, inventor (to NASA), JEWELL G. BELCHER, JR., inventor (to NASA), JAMES R. CARDEN, inventor (to NASA), and THOMAS W. WEST, inventor (to NASA) 4 Jun. 1991 10 p Filed 12 Apr. 1990 Supersedes N90-27261 (28 - 21, p 3036)

(NASA-CASE-MFS-28426-1; US-PATENT-5,021,065; US-PATENT-APPL-SN-508154; US-PATENT-CLASS-623-63; US-PATENT-CLASS-623-62; INT-PATENT-CLASS-A61F-2/58; INT-PATENT-CLASS-A61F-2/68) Avail: US Patent and Trademark Office CSCL 06K

A prosthetic device has been developed for below-the-elbow amputees. The device consists of a cuff, a stem, a housing, two hook-like fingers, an elastic band for holding the fingers together, and a brace. The fingers are pivotally mounted on a housing that is secured to the amputee's upper arm with the brace. The stem, which also contains a cam, is rotationally mounted within the housing and is secured to the cuff, which fits over the amputee's stump. By rotating the cammed stem between the fingers with the lower arm, the amputee can open and close the fingers.

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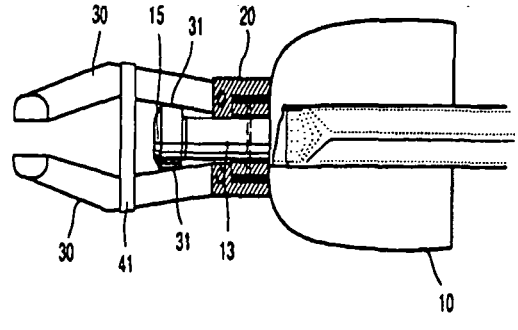


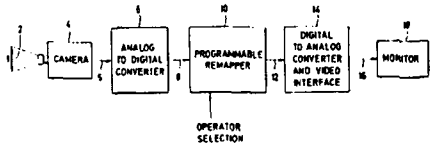
60
COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware, and data processing.

N91-23724*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
PROGRAMMABLE REMAPPER FOR IMAGE PROCESSING Patent Application
TIM E. FISHER, inventor (to NASA), RICHARD D. JUDAY, inventor (to NASA), and JEFFREY B. SAMPSELL, inventor (to NASA) (Texas Instruments, Inc., Dallas.) 30 Mar. 1989 45 p
(NASA-CASE-MSC-21350-1; NAS 1.71:MSC-21350-1; US-PATENT-APPL-SN-331551) Avail: NTIS HC/MF A03 CSCL 09B

A video-rate coordinate remapper includes a memory for storing a plurality of transformations on look-up tables for remapping input images from one coordinate system to another. Such transformations are operator selectable. The remapper includes a collective processor by which certain input pixels of an input image are transformed to a portion of the output image in a many-to-one relationship. The remapper includes an interpolative processor by which the remaining input pixels of the input image are transformed to another portion of the output image in a one-to-many relationship. The invention includes certain specific transforms for creating output images useful for certain defects of visually impaired people. The invention also includes means for shifting input pixels and means for scrolling the output matrix.

NASA



N91-31810* National Aeronautics and Space Administration. Pasadena Office, CA.
ASYMMETRIC SOFT-ERROR RESISTANT MEMORY Patent
MARTIN G. BUEHLER, inventor (to NASA) and MARVIN PERLMAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Sep. 1991 7 p Filed, 16 Feb. 1989
(NASA-CASE-NPO-17394-1-CU; US-PATENT-5,048,023; US-PATENT-APPL-SN-311024; US-PATENT-CLASS-371-40.1; US-PATENT-CLASS-365-156; US-PATENT-CLASS-365-200; INT-PATENT-CLASS-G11C-29/00; *INT-PATENT-CLASS-H03M-13/00)* Avail: US Patent and Trademark Office CSCL 09B

A memory system is provided, of the type that includes an error-correcting circuit that detects and corrects, that more efficiently utilizes the capacity of a memory formed of groups of binary cells whose states can be inadvertently switched by ionizing radiation. Each memory cell has an asymmetric geometry, so that ionizing radiation causes a significantly greater probability of errors in one state than in the opposite state (e.g., an erroneous switch *from '1' to '0' is far more likely than a switch from '0' to'1'.* An asymmetric error correcting coding circuit can be used with the asymmetric memory cells, which requires fewer bits than an efficient symmetric error correcting code.

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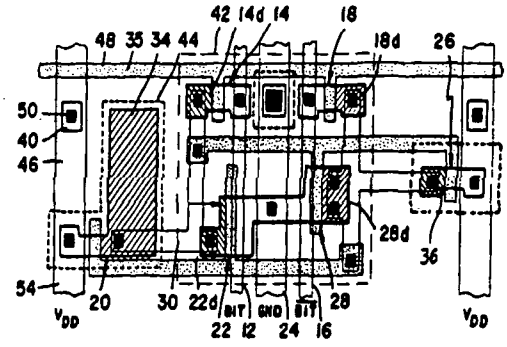
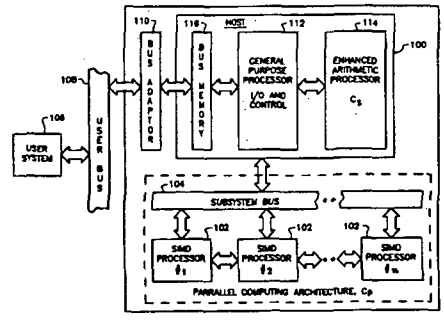


N91-32805*# National Aeronautics and Space Administration. Pasadena Office, CA.
HIGHLY PARALLEL COMPUTER ARCHITECTURE FOR ROBOTIC COMPUTATION Patent Application
AMIR FIJANY, inventor (to NASA) and ANTA K. BEJCZY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Jun. 1991 28 p
(Contract NAS7-918)
(NASA-CASE-NPO-17632-1-CU; NAS 1.71:NPO-17632-1-CU; US-PATENT-APPL-SN-712796) Avail: NTIS HC/MF A03 CSCL 09B

In a computer having a large number of single instruction multiple data (SIMD) processors, each of the SIMD processors has two sets of three individual processor elements controlled by a master control unit and interconnected among a plurality of register file units where data is stored. The register files input andoutput data in synchronism with a minor cycle clock under control of two slave control units controlling the register file units connected to respective ones of the two sets of processor elements. Depending upon which ones of the register file units are enabled to store or transmit data during a particular minor clock cycle, the processor elements within an SIMD processor are connected in rings or in pipeline arrays, and may exchange data with the internal bus or with neighboring SIMD processors through interface units controlled by respective ones of the two slave control units.

NASA



62
COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

N91-25693*# National Aeronautics and Space Administration. Pasadena Office, CA.
DYNAMIC RESOURCE ALLOCATION SCHEME FOR DISTRIBUTED HETEROGENEOUS COMPUTER SYSTEMS Patent
HOWARD T. LIU, inventor (to NASA) and JOHN A. SILVESTER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Jul. 1991 12 p Filed 30 Dec.1988 Supersedes N89-29978 (27 - 24, p 3493)
(Contract NAS7-918)
(NASA-CASE-NPO-17197-1-CU; US-PATENT-5,031,089; US-PATENT-APPL-SN-292124; US-PATENT-CLASS-364-200; US-PATENT-CLASS-364-281.3; US-PATENT-CLASS-364-281; US-PATENT-CLASS-364-281.6; US-PATENT-CLASS-364-281.8; INT-PATENT-CLASS-G06F-12/00) Avail: US Patent and Trademark Office CSCL 09B

This invention relates to a resource allocation in computer systems, and more particularly, to a method and associated apparatus for shortening response time and improving efficiency of a heterogeneous distributed networked computer system by reallocating the jobs queued up for busy nodes to idle, or less-busy nodes. In accordance with the algorithm (SIDA for short), the load-sharing is initiated by the server device in a manner such that extra overhead in not imposed on the system during heavily-loaded conditions. The algorithm employed in the present invention uses a dual-mode, server-initiated approach. Jobs are transferred from heavily burdened nodes (i.e., over a high threshold limit) to low burdened nodes at the initiation of the receiving node when: (1) a job finishes at a node which is burdened below a pre-established threshold level, or (2) a node is idle for a period of time as established by a wakeup timer at the node. The invention uses a combination of the local queue length and the local service rate ratio at each node as the workload indicator.

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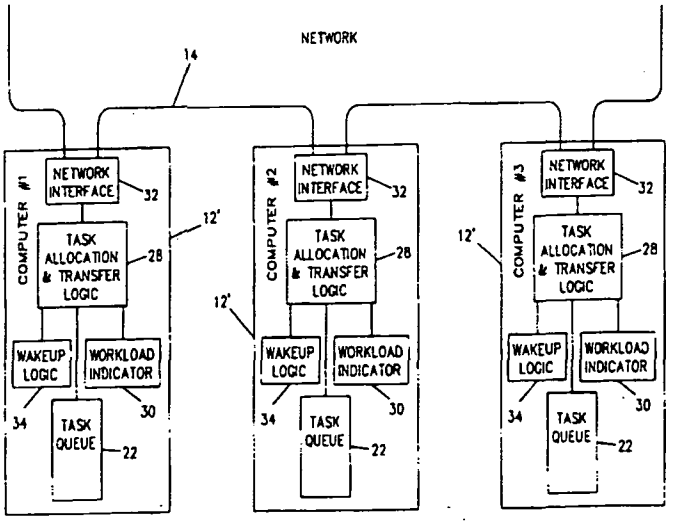

N91-32852* National Aeronautics and Space Administration. Pasadena Office, CA.
ANALOG HARDWARE FOR LEARNING NEURAL NETWORKS Patent
SILVIO P. EBERHARDT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 8 Oct. 1991 11 p Filed 28 Dec. 1989 Supersedes N90-27384 (30 - 21, p 3057)
(NASA-CASE-NPO-17664-1-CU; US-PATENT-5,056,037; US-PATENT-APPL-SN-463720; US-PATENT-CLASS-364-513; US-PATENT-CLASS-364-807; INT-PATENT-CLASS-G06G-7/12)
Avail: US Patent and Trademark Office CSCL 09B

This is a recurrent or feedforward analog neural network processor having a multi-level neuron array and a synaptic matrix for storing weighted analog values of synaptic connection strengths which is characterized by temporarily changing one connection strength at a time to determine its effect on system output relative to the desired target. That connection strength is then adjusted based on the effect, whereby the processor is taught the correct response to training examples connection by connection.

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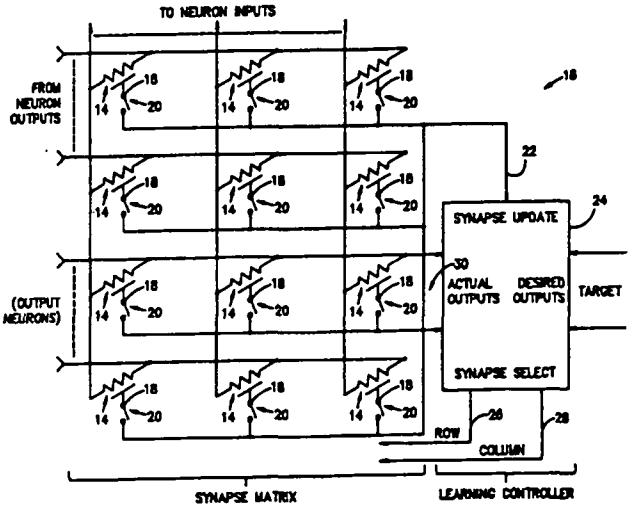


63
CYBERNETICS

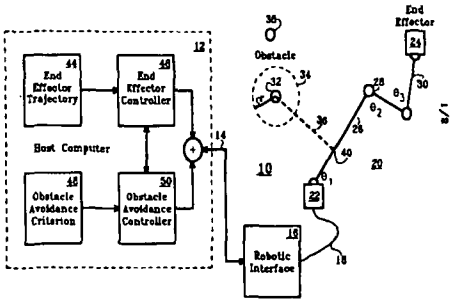
Includes feedback and control theory, artificial intelligence, robotics and expert systems.

N91-23783*# National Aeronautics and Space Administration. Pasadena Office, CA.
OBSTACLE AVOIDANCE FOR REDUNDANT ROBOTS USING CONFIGURATION CONTROL Patent Application
HOMAYOUN SERAJI, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) et al. 11 Sep. 1990 26 p
(Contract NAS7-918)
(NASA-CASE-NPO-17852-1-CU; NAS 1.71:NPO-17852-1-CU; US-PATENT-APPL-SN-615668) Avail: NTIS HC/MF A03 CSCL 09B

A redundant robot control scheme is provided for avoiding

obstacles in a workspace during the motion of an end effector along a preselected trajectory by stopping motion of the critical point on the robot closest to the obstacle when the distance between is reduced to a predetermined sphere of influence surrounding the obstacle. Algorithms are provided for conveniently determining the critical point and critical distance.

NASA



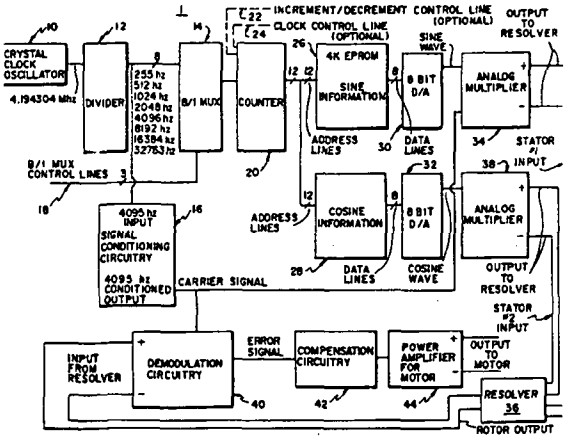
N91-28785*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

DRIVEN SHIELDING CAPACITIVE PROXIMITY SENSOR
Patent Application

JOHN M. VRANISH, inventor (to NASA) and ROBERT L. MCCONNELL, inventor (to NASA) 6 Jun. 1991 12 p
(NASA-CASE-GSC-13377-1; NAS 1.71:GSC-13377-1; US-PATENT-APPL-SN-710845) Avail: NTIS HC/MF A03 CSCL 09B

A capacitive proximity sensing element, backed by a reflector driven at the same voltage as and in phase with the sensor, is used to reflect the field lines away from a grounded robot arm towards an intruding object, thus dramatically increasing the senors's range and sensitivity.

NASA



N91-31885* National Aeronautics and Space Administration. Pasadena Office, CA.

SYNCHRONIZED COMPUTATIONAL ARCHITECTURE FOR GENERALIZED BILATERAL CONTROL OF ROBOT ARMS
Patent

ZOLTAN F. SZAKALY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 6 Aug. 1991 19 p
Filed 28 Oct. 1988 Continuation-in-part of abandoned US-Patent-Appl-SN-172105, filed 23 Mar. 1988
(NASA-CASE-NPO-17401-1-CU; US-PATENT-5,038,089; US-PATENT-APPL-SN-264326; US-PATENT-APPL-SN-172105; US-PATENT-CLASS-318-568.11; US-PATENT-CLASS-318-573; US-PATENT-CLASS-364-513; INT-PATENT-CLASS-G05B-19/24; INT-PATENT-CLASS-G06F-15/46) Avail: US Patent and Trademark Office CSCL 09B

A master six degree of freedom Force Reflecting Hand Controller (FRHC) is available at a master site where a received image displays, in essentially real time, a remote robotic manipulator which is being controlled in the corresponding six degree freedom by command signals which are transmitted to the remote site in accordance with the movement of the FRHC at the master site. Software is user-initiated at the master site in order to establish the basic system conditions, and then a physical movement of the FRHC in Cartesean space is reflected at the master site by six absolute numbers that are sensed, translated and computed as a difference signal relative to the earlier position. The change in position is then transmitted in that differential signal form over a high speed synchronized bilateral communication channel which simultaneously returns robot-sensed response information to the master site as forces applied to the FRHC so that the FRHC reflects the feel of what is taking place at the remote site. A system wide clock rate is selected at a sufficiently high rate that the operator at the master site experiences the Force Reflecting operation in real time.

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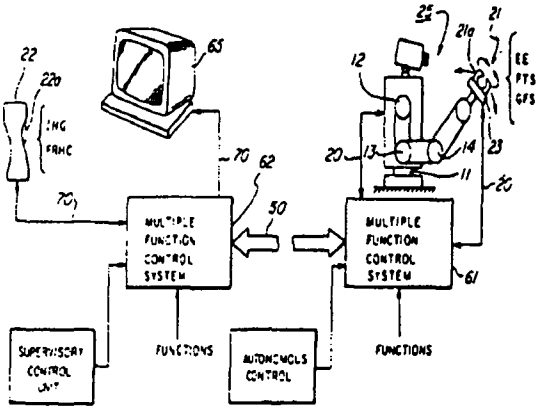

70
PHYSICS (GENERAL)

N91-21824* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PERMANENT MAGNET FLUX-BIASED MAGNETIC

ACTUATOR WITH FLUX FEEDBACK Patent
NELSON J. GROOM, inventor (to NASA) 26 Mar. 1991 7 p Filed 11 Sep. 1989 Supersedes N90-17403 (28 - 9, p 1277) (NASA-CASE-LAR-13785-1; US-PATENT-5,003,211; US-PATENT-APPL-SN-405168; US-PATENT-CLASS-310-90.5; INT-PATENT-CLASS-H02K-7/09) Avail: US Patent and Trademark Office CSCL 20C

The invention is a permanent magnet flux-biased magnetic actuator with flux feedback for adjustably suspending an element on a single axis. The magnetic actuator includes a pair of opposing electromagnets and provides bi-directional forces along the single axis to the suspended element. Permanent magnets in flux feedback loops from the opposing electromagnets establish a reference permanent magnet flux-bias to linearize the force characteristics of the electromagnets to extend the linear range of the actuator without the need for continuous bias currents in the electromagnets.

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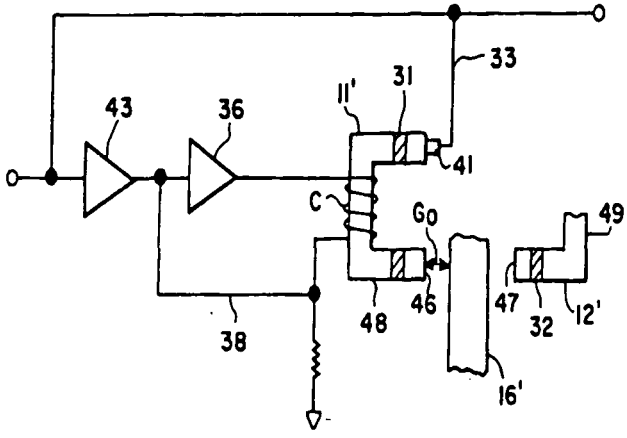

71
ACOUSTICS

Includes sound generation, transmission, and attenuation.

N91-27913* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SOUND ATTENUATION APPARATUS Patent
KEVIN P. SHEPHERD, inventor (to NASA) and FERDINAND M. W. A. GROSVELD, inventor (to NASA) (Planning Research Corp., Hampton, VA.) 18 Jun. 1991 11 p Filed 10 Aug. 1989 (NASA-CASE-LAR-13968-1; US-PATENT-5,024,288; US-PATENT-APPL-SN-392165; US-PATENT-CLASS-181-206; US-PATENT-CLASS-181-286; US-PATENT-CLASS-181-290; US-PATENT-CLASS-181-295; US-PATENT-CLASS-381-71; US-PATENT-CLASS-381-94; US-PATENT-CLASS-52-144) Avail: US Patent and Trademark Office CSCL 20A

An apparatus is disclosed for reducing acoustic transmission from mechanical or acoustic sources by means of a double wall partition, within which an acoustic pressure field is generated by at least one secondary acoustic source. The secondary acoustic source is advantageously placed within the partition, around its edges, or it may be an integral part of a wall of the partition.

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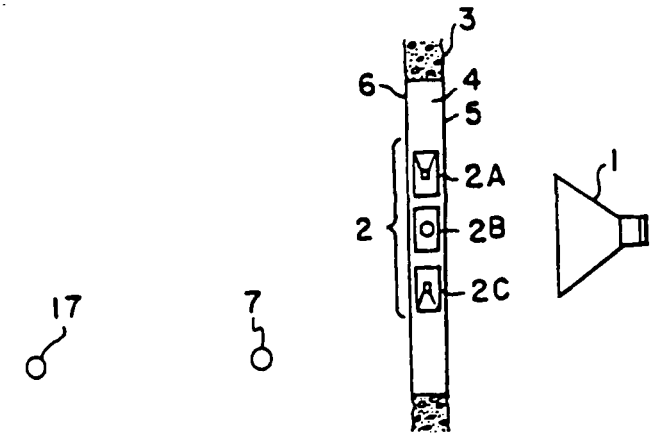

N91-27914* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR CHARACTERIZING REFLECTED ULTRASONIC PULSES Patent
WILLIAM T. YOST, inventor (to NASA) and JOHN H. CANTRELL, JR., inventor (to NASA) 16 Jul. 1991 32 p Filed 17 Oct. 1989
(NASA-CASE-LAR-13966-1; US-PATENT-5,031,627; US-PATENT-APPL-SN-422726; US-PATENT-CLASS-128-660.06; US-PATENT-CLASS-73-631; INT-PATENT-CLASS-A61B-8/00)
Avail: US Patent and Trademark Office CSCL 20A

The invention is a method of and apparatus for characterizing the amplitudes of a sequence of reflected pulses R1, R2, and R3 by converting them into corresponding electric signals E1, E2, and E3 to substantially the same value during each sequence thereby restoring the reflected pulses R1, R2, and R3 to their initial reflection values by timing means, an exponential generator, and a time gain compensator. Envelope and baseline reject circuits permit the display and accurate location of the time spaced sequence of electric signals having substantially the same amplitude on a measurement scale on a suitable video display or oscilloscope.

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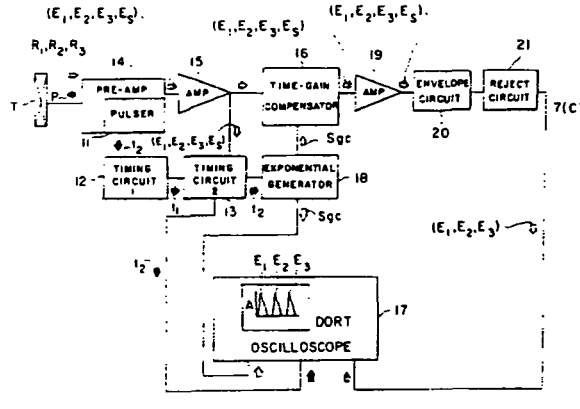

72
ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure, electron properties, and molecular spectra.

N91-27936* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SLOW POSITRON BEAM GENERATOR FOR LIFETIME STUDIES Patent
JAG J. SINGH, inventor (to NASA), ABE EFTEKHARI, inventor (to NASA), and TERRY L. ST.CLAIR, inventor (to NASA) 14 May 1991 21 p Filed 31 May 1990
(NASA-CASE-LAR-14250-1-SB; US-PATENT-5,015,851; US-PATENT-APPL-SN-531372; US-PATENT-CLASS-250-306; US-PATENT-CLASS-250-307; US-PATENT-CLASS-250-358.1; INT-PATENT-CLASS-H01J-37/00) Avail: US Patent and Trademark Office CSCL 20H

A slow positron beam generator uses a conductive source residing between two test films. Moderator pieces are placed next to the test film on the opposite side of the conductive source. A voltage potential is applied between the moderator pieces and the conductive source. Incident energetic positrons: (1) are emitted from the conductive source; (2) are passed through test film; and (3) isotropically strike moderator pieces before diffusing out of the moderator pieces as slow positrons, respectively. The slow positrons diffusing out of moderator pieces are attracted to the conductive source which is held at an appropriate potential below the moderator pieces. The slow positrons have to pass through the test films before reaching the conductive source. A voltage is adjusted so that the potential difference between the moderator pieces and the conductive source forces the positrons to stop in the test films. Measurable annihilation radiation is emitted from the test film when positrons annihilate (combine) with electrons in the test film.

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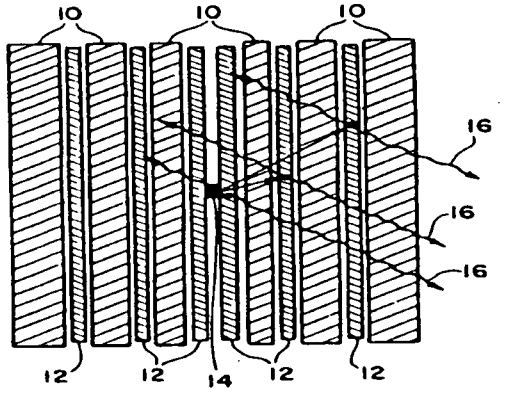


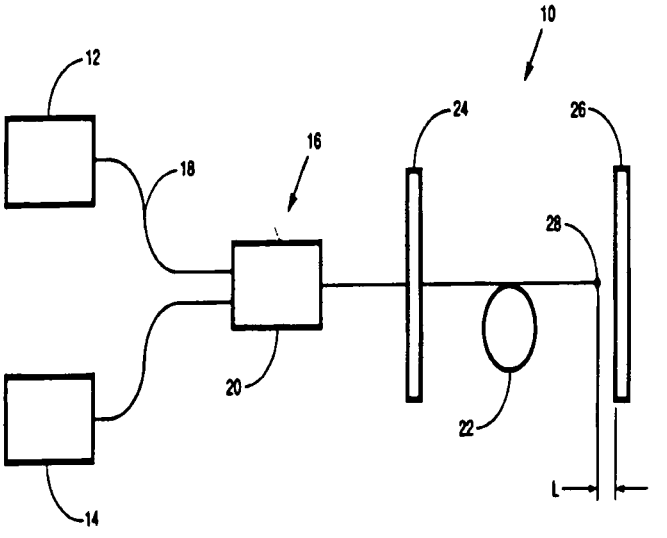
74
OPTICS

Includes light phenomena; and optical devices.

N91-21871* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
FIBER OPTIC SENSING SYSTEM Patent
GRIGORY ADAMOVSKY, inventor (to NASA) 26 Feb. 1991 8 p Filed 7 Sep. 1989 Supersedes N90-15733 (28 - 7, p 992)
(NASA-CASE-LEW-14795-1; US-PATENT-4,995,697; US-PATENT-APPL-SN-404291; US-PATENT-CLASS-350-96.29; US-PATENT-CLASS-356-345; US-PATENT-CLASS-250-227; INT-PATENT-CLASS-G02B-6/02; INT-PATENT-CLASS-G02B-6/16; INT-PATENT-CLASS-G01B-9/02) Avail: US Patent and Trademark Office CSCL 20F

A fiber optic interferometer utilizes a low coherence light emitting diode (LED) laser as a light source which is filtered and driven at two RF frequencies, high and low, that are specific to the initial length of the resonator chamber. A displacement of a reflecting mirror changes the length traveled by the nonreferencing signal. The low frequency light undergoes destructive interference which reduces the average intensity of the wave while the high frequency light undergoes constructive interference which increases the average intensity of the wave. The ratio of these two intensity measurements is proportional to the displacement incurred.

Official Gazette of the U.S. Patent and Trademark Office

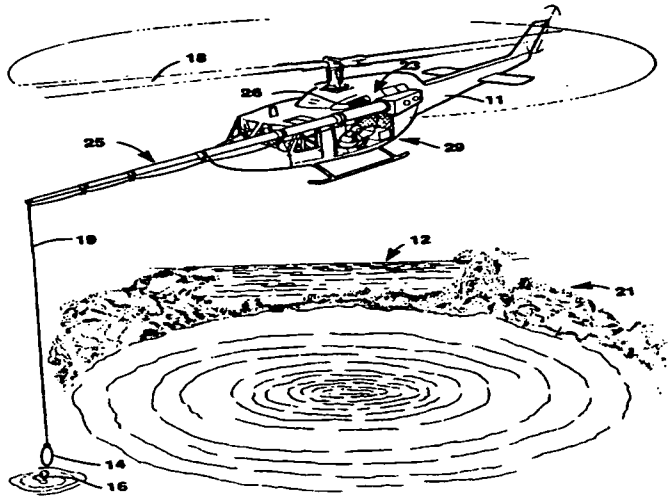


N91-23889*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
NON-MECHANICAL OPTICAL PATH SWITCHING AND ITS APPLICATION TO DUAL BEAM SPECTROSCOPY INCLUDING GAS FILTER CORRELATION RADIOMETRY Patent Application
GLEN W. SACHSE, inventor (to NASA) and LIANG-GUO WANG, inventor (to NASA) (College of William and Mary, Hampton, VA.) 11 Feb. 1991 19 p
(NASA-CASE-LAR-14588-1-CU; NAS 1.71:LAR-14588-1-CU; US-PATENT-APPL-SN-653605) Avail: NTIS HC/MF A03 CSCL 20F

A non-mechanical optical switch is provided for alternately switching a monochromatic or quasi-monochromatic light beam along two optical paths. A polarizer polarizes light into a single, e.g., vertical component which is then rapidly modulated into vertical and horizontal components by a polarization modulator. A polarization beam splitter then reflects one of these components along one path and transmits the other along the second path. In the specific application of gas filter correlation radiometry, one

path is directed through a vacuum cell and one path is directed through a gas correlation cell containing a desired gas. Reflecting mirrors cause these two paths to intersect at a second polarization beam splitter which reflects one component and transmits the other to recombine them into a polarization modulated beam which can be detected by an appropriate single sensor.

NASA



N91-23890*# National Aeronautics and Space Administration. Pasadena Office, CA.

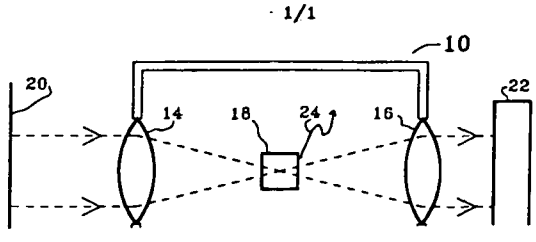
REAL TIME PRE-DETECTION DYNAMIC RANGE COMPRESSION Patent Application

HUA-KUANG LIU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 5 Dec. 1990 15 p (Contract NAS7-918)

(NASA-CASE-NPO-18098-1-CU; NAS 1.71:NPO-18098-1-CU; US-PATENT-APPL-SN-633746) Avail: NTIS HC/MF A03 CSCL 20F

A real time, pre-detection optical dynamic range compression system uses a photorefractive crystal, such as BaTiO3 or LiNbO3, in which light induced scattering from crystal inhomogeneities of the optical input occurs as a nonlinear function of the input intensity. The greater the intensity, the faster random interference gratings are created to scatter the incident light. The unscattered portion of the optical signal is therefore reduced in dynamic range over time. The amount or range of dynamic range compression may be controlled by adjusting the time of application of the unscattered crystal output to the photodetector with regard to the time of application of the optical input to the crystal.

NASA



N91-24878*# National Aeronautics and Space Administration. Pasadena Office, CA.

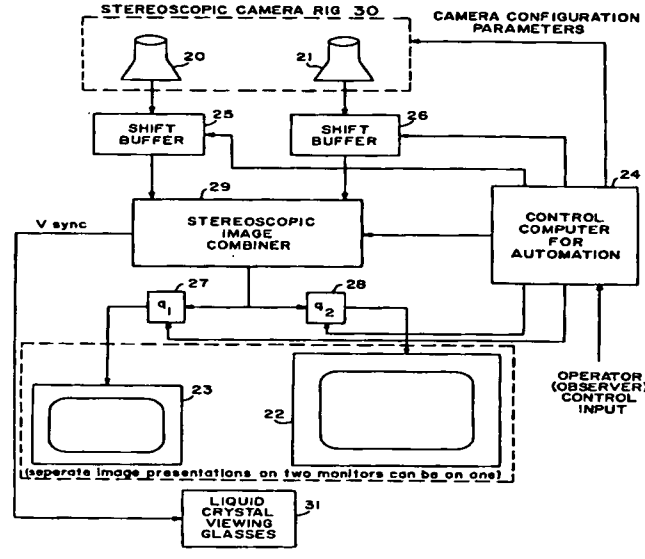
STEREOSCOPIC CAMERA AND VIEWING SYSTEMS WITH UNDISTORTED DEPTH PRESENTATION AND REDUCED OR ELIMINATED ERRONEOUS ACCELERATION AND DECELERATION PERCEPTIONS, OR WITH PERCEPTIONS PRODUCED OR ENHANCED FOR SPECIAL EFFECTS Patent Application

DANIEL B. DINER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 2 Nov. 1990 42 p (Contract NAS7-918)

(NASA-CASE-NPO-18028-1-CU; NAS 1.71:NPO-18028-1-CU; US-PATENT-APPL-SN-608452) Avail: NTIS HC/MF A03 CSCL 20F

Methods for providing stereoscopic image presentation and stereoscopic configurations using stereoscopic viewing systems having converged or parallel cameras may be set up to reduce or eliminate erroneously perceived accelerations and decelerations by proper selection of parameters, such as an image magnification factor, q, and intercamera distance, 2w. For converged cameras, q is selected to be equal to Ve - qwl = 0, where V is the camera distance, e is half the interocular distance of an observer, w is half the intercamera distance, and l is the actual distance from the first nodal point of each camera to the convergence point, and for parallel cameras, q is selected to be equal to e/w. While converged cameras cannot be set up to provide fully undistorted three-dimensional views, they can be set up to provide a linear relationship between real and apparent depth and thus minimize erroneouly perceived accelerations and decelerations for three sagittal planes, x = -w, x = 0, and x = +w which are indicated to the observer. Parallel cameras can be set up to provide fully undistorted three-dimensional views by controlling the location of the observer and by magnification and shifting of left and right images. In addition, the teachings of this disclosure can be used to provide methods of stereoscopic image presentation and stereoscopic camera configurations to produce a nonlinear relation between perceived and real depth, and erroneously produce of enhance perceived accelerations and decelerations in order to provide special effects for entertainment, training, or educational purposes.

NASA



N91-25840* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

OPTICAL JOINT CORRELATOR FOR REAL-TIME IMAGE TRACKING AND RETINAL SURGERY Patent

RICHARD D. JUDAY, inventor (to NASA) 2 Jul. 1991 10 p Filed 13 Jul. 1990 Supersedes N91-13997 (29 - 5, p 716) (NASA-CASE-MSC-21509-1; US-PATENT-5,029,220; US-PATENT-APPL-SN-560924; US-PATENT-CLASS-382-6; US-PATENT-CLASS-382-31; US-PATENT-CLASS-382-32; US-PATENT-CLASS-382-43; US-PATENT-CLASS-382-49; US-PATENT-CLASS-350-162.13; US-PATENT-CLASS-350-3.68) Avail: US Patent and Trademark Office CSCL 20F

A method for tracking an object in a sequence of images is described. Such sequence of images may, for example, be a sequence of television frames. The object in the current frame is correlated with the object in the previous frame to obtain the relative location of the object in the two frames. An optical joint transform correlator apparatus is provided to carry out the process. Such joint transform correlator apparatus forms the basis for laser eye surgical apparatus where an image of the fundus of an eyeball is stabilized and forms the basis for the correlator apparatus to track the position of the eyeball caused by involuntary movement. With knowledge of the eyeball position, a surgical laser can be precisely pointed toward a position on the retina.

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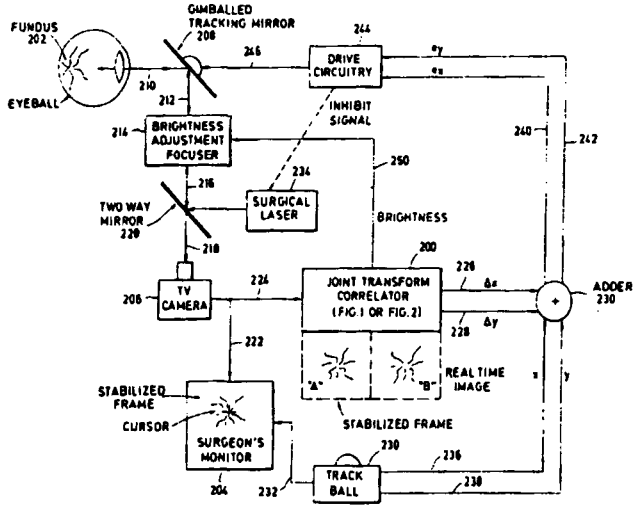

N91-25841* National Aeronautics and Space Administration. Pasadena Office, CA.

HIGH-GAIN ALGAAS/GAAS DOUBLE HETEROJUNCTION DARLINGTON PHOTOTRANSISTORS FOR OPTICAL NEURAL NETWORKS Patent

JAE H. KIM, inventor (to NASA) and STEVEN H. LIN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 25 Jun. 1991 12 p Filed 11 Oct. 1990 Supersedes N91-13995 (29 - 5, p 716)
(Contract NAS7-918)
(NASA-CASE-NPO-18101-1-CU; US-PATENT-5,027,182; US-PATENT-APPL-SN-596133; US-PATENT-CLASS-357-46; US-PATENT-CLASS-357-16; US-PATENT-CLASS-357-17; US-PATENT-CLASS-357-34; US-PATENT-CLASS-357-30; INT-PATENT-CLASS-H01L-27/02; INT-PATENT-CLASS-H01L-29/161) Avail: US Patent and Trademark Office CSCL 20F

High-gain MOCVD-grown (metal-organic chemical vapor deposition) AlGaAs/GaAs/AlGaAs n-p-n double heterojunction bipolar transistors (DHBTs) and Darlington phototransistor pairs are provided for use in optical neural networks and other optoelectronic integrated circuit applications. The reduced base doping level used results in effective blockage of Zn out-diffusion, enabling a current gain of 500, higher than most previously reported values for Zn-diffused-base DHBTs. Darlington phototransitor pairs of this material can achieve a current gain of over 6000, which satisfies the gain requirement for optical neural network designs, which advantageously may employ neurons comprising the Darlington phototransistor pairs in series with a light source.

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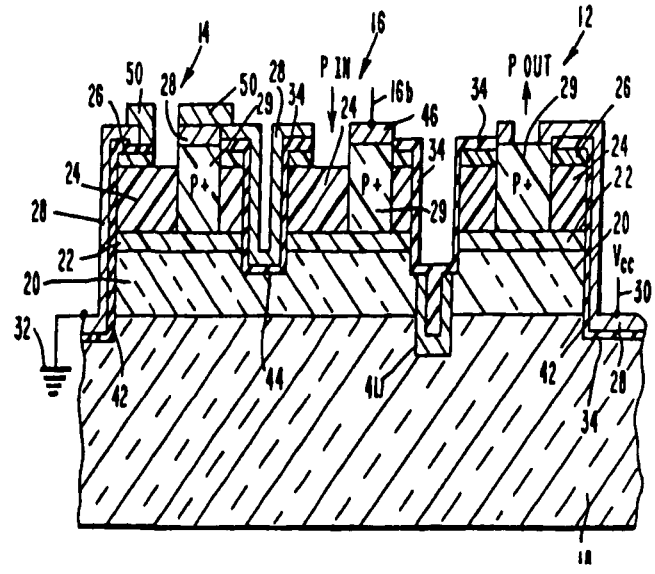

N91-26918* National Aeronautics and Space Administration. Pasadena Office, CA.

METHOD AND APPARATUS FOR SECOND-RANK TENSOR GENERATION Patent

HUA-KUANG LIU, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Apr. 1991 5 p Filed 16 Feb. 1989 Sponsored by NASA
(NASA-CASE-NPO-17512-1-CU; US-PATENT-5,005,954; US-PATENT-APPL-SN-310992; US-PATENT-CLASS-350-354; US-PATENT-CLASS-350-353; US-PATENT-CLASS-350-358; US-PATENT-CLASS-364-713; US-PATENT-CLASS-364-822; US-PATENT-CLASS-364-837; US-PATENT-CLASS-364-841) Avail: US Patent and Trademark Office CSCL 20F

A method and apparatus are disclosed for generation of second-rank tensors using a photorefractive crystal to perform the outer-product between two vectors via four-wave mixing, thereby taking 2n input data to a control n squared output data points. Two orthogonal amplitude modulated coherent vector beams x and y are expanded and then parallel sides of the photorefractive crystal in exact opposition. A beamsplitter is used to direct a coherent pumping beam onto the crystal at an appropriate angle so as to produce a conjugate beam that is the matrix product of the vector beam that propagates in the exact

opposite direction from the pumping beam. The conjugate beam thus separated is the tensor output xy (sup T).

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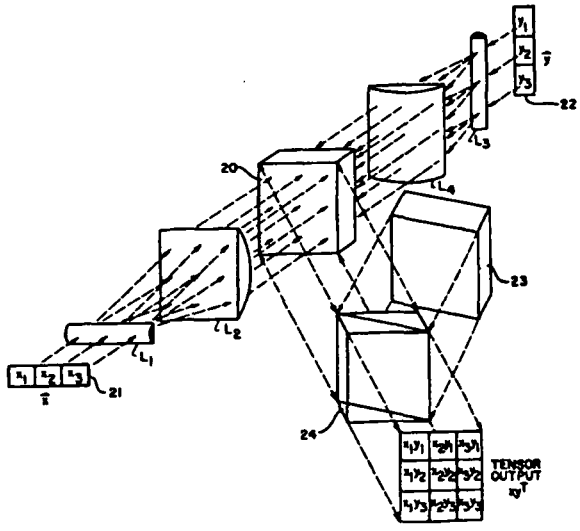

N91-27957* National Aeronautics and Space Administration. Pasadena Office, CA.

FIBER OPTIC FREQUENCY TRANSFER LINK Patent

LORI E. PRIMAS, inventor (to NASA), RICHARD L. SYDNOR, inventor (to NASA), and GEORGE F. LUTES, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Jul. 1991 22 p Filed 31 May 1989

(Contract NAS7-918)

(NASA-CASE-NPO-17703-1-CU; US-PATENT-5,031,234; US-PATENT-APPL-SN-359801; US-PATENT-CLASS-455-605; US-PATENT-CLASS-356-5; INT-PATENT-CLASS-H04B-10/00)

Avail: US Patent and Trademark Office CSCL 20F

A reference frequency distribution system is disclosed for transmitting a reference frequency from a reference unit to a remote unit while keeping the reference frequency at the reference unit and the remote unit in phase. A fiber optic cable connects the reference unit to the remote unit. A frequency source at the reference unit produces a reference frequency having an adjustable phase. A fiber optic transmitter at the reference unit modulates a light beam with the reference frequency and transmits the light beam into the fiber optic cable. A 50/50 reflector at the remote unit reflects a first portion of the light beam from the reference unit back into the fiber optic cable to the reference unit. A first fiber optic receiver disposed at the remote unit receives a second portion of the light beam and demodulates the reference frequency to be used at the remote unit. A second fiber optic receiver disposed at the reference unit receives the first portion of the light beam and demodulates a reference frequency component. A phase conjugator is connected to the frequency source for comparing the phase of the reference frequency component to the phase of the reference frequency modulating the light beam being transmitted from the reference unit to maintain a conjugate (anti-symmetric) relationship between the reference frequency component and the reference frequency modulating the light beam where virtually no phase difference exists between the phase of the reference frequency component and the phase of the reference frequency modulating the light beam.

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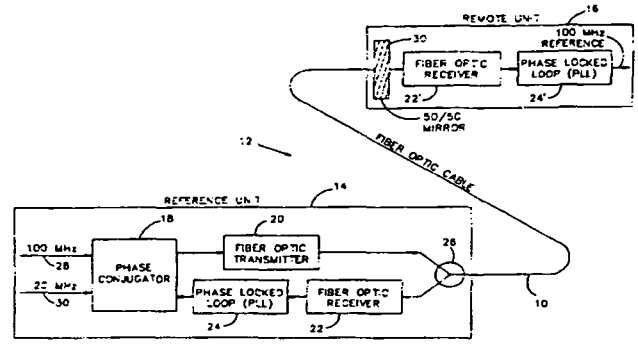

N91-31950* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SINGLE LAYER MULTI-COLOR LUMINESCENT DISPLAY Patent

JAMES B. ROBERTSON, inventor (to NASA) 10 Sep. 1991 8 p *Filed 31 Dec. 1987*

(NASA-CASE-LAR-13616-1; US-PATENT-5,047,686; US-PATENT-APPL-SN-140185; US-PATENT-CLASS-313-503; US-PATENT-CLASS-313-506; US-PATENT-CLASS-313-509; US-PATENT-CLASS-313-502; INT-PATENT-CLASS-H05B-33/14)

Avail: US Patent and Trademark Office CSCL 20F

The invention is a multi-color luminescent display comprising an insulator substrate and a single layer of host material which may be a phosphor deposited thereon that hosts one or more differential impurities, therein forming a pattern of selected and distinctly colored phosphors such as blue, green, and red phosphors in a single layer of host material. Transparent electrical conductor means may be provided for subjecting selected portions of the pattern of colored phosphors to an electric field thereby forming a multi-color, single layer electroluminescent display.

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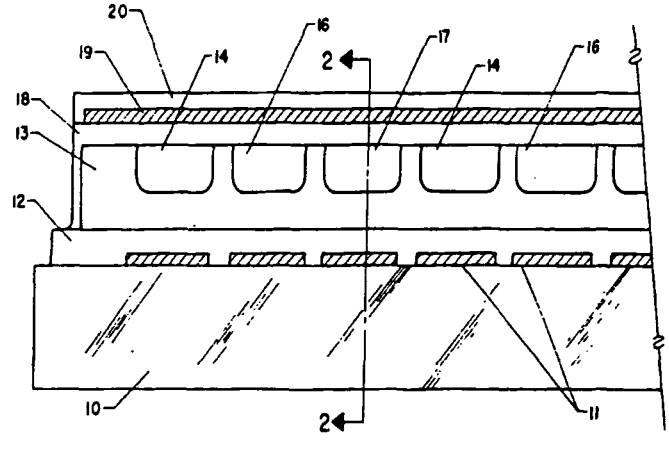
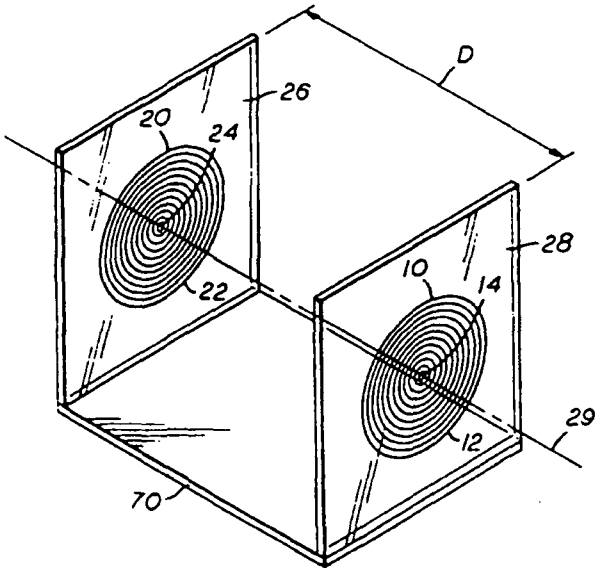


N91-32922* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
THREE DIMENSIONAL MOIRE PATTERN ALIGNMENT Patent
RICHARD D. JUDAY, *inventor (to NASA)* 1 Oct. 1991 13 p Filed 28 Jun. 1990 Supersedes N91-14000 (29 - 5 p 717) (NASA-CASE-MSC-21416-1; US-PATENT-5,052,807; US-PATENT-APPL-SN-545177; US-PATENT-CLASS-356-375; US-PATENT-CLASS-356-399; INT-PATENT-CLASS-G01B-11/00) Avail: US Patent and Trademark Office CSCL 20F

An apparatus is disclosed for determining three dimensional positioning relative to a predetermined point utilizing moire interference patterns such that the patterns are complementary when viewed on axis from the predetermined distance. Further, the invention includes means for determining rotational positioning in addition to three dimensional translational positioning.

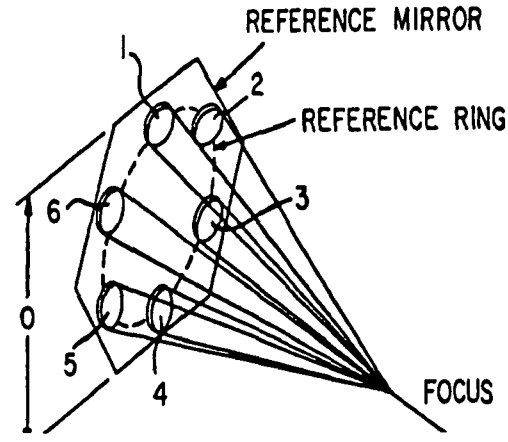
Official Gazette of the U.S. Patent and Trademark Office



N91-32923*# National Aeronautics and Space Administration. Pasadena Office, CA.
METHOD AND APPARATUS FOR PHASING SEGMENTED MIRROR ARRAYS Patent Application
PAUL K. MANHART, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 3 Mar. 1991 25 p (Contract NAS7-918) (NASA-CASE-NPO-18095-1-CU; NAS 1.71:NPO-18095-1-CU; US-PATENT-APPL-SN-665509) Avail: NTIS HC/MF A03 CSCL 20F

A method and apparatus are disclosed for edge phasing an array of segments in a segmented primary telescope mirror using white light from a far field source and starting with the inner edge of each segment in the first ring of segments. The segments are individually phased for zero piston and tilt error with respect to the edge of a reference surface in the open center position of the telescope mirror, and proceeding from ring to ring by edge phasing one edge of each segment in each subsequent ring with an edge phased. After edge phasing of all segments in the telescope mirror array has been completed, full surface phasing can be achieved by using a conventional Shack-Hartmann technique followed by finding the RMS best fit for each segment of the mirror array.

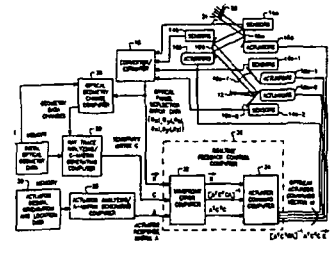
NASA



N91-32924*# National Aeronautics and Space Administration. Pasadena Office, CA.
FEEDBACK CONTROLLED OPTICS WITH WAVEFRONT COMPENSATION Patent Application
WILLIAM C. BRECKENRIDGE, inventor (to NASA) and DAVID C. REDDING, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 13 May 1991 31 p (Contract NAS7-918) (NASA-CASE-NPO-18194-1-CU; NAS 1.71:NPO-18194-1-CU; US-PATENT-APPL-SN-700379) Avail: NTIS HC/MF A03 CSCL 20F

The sensitivity model of a complex optical system obtained by linear ray tracing is used to compute a control gain matrix by imposing the mathematical condition for minimizing the total wavefront error at the optical system's exit pupil. The most recent deformations or error states of the controlled segments or optical surfaces of the system are then assembled as an error vector, and the error vector is transformed by the control gain matrix to produce the exact control variables which will minimize the total wavefront error at the exit pupil of the optical system. These exact control variables are then applied to the actuators controlling the various optical surfaces in the system, causing the immediate reduction in total wavefront error observed at the exit pupil of the optical system.

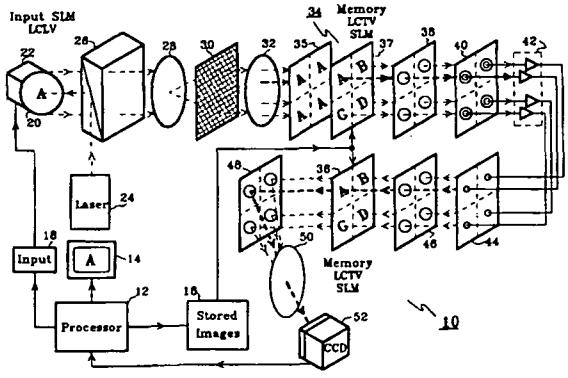
NASA



N91-32925*# National Aeronautics and Space Administration. Pasadena Office, CA.
OPTOELECTRONIC ASSOCIATIVE MEMORY Patent Application
TIEN-HSIN CHAO, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 19 Aug. 1991 17 p
(Contract NAS7-918)
(NASA-CASE-NPO-18278-1-CU; NAS 1.71:NPO-18278-1-CU; US-PATENT-APPL-SN-747059) Avail: NTIS HC/MF A03 CSCL 20F

An associative optical memory including an input spatial light modulator (SLM) in the form of an edge enhanced liquid crystal light valve (LCLV) and a pair of memory SLMs in the form of liquid crystal televisions (LCTVs) forms a matrix array of an input image which is cross correlated with a matrix array of stored images. The correlation product is detected and nonlinearly amplified to illuminate a replica of the stored image array to select the stored image correlating with the input image. The LCLV is edge enhanced by reducing the bias frequency and voltage and rotating its orientation. The edge enhancement and nonlinearity of the photodetection improves the orthogonality of the stored image. The illumination of the replicate stored image provides a clean stored image, uncontaminated by the image comparison process.

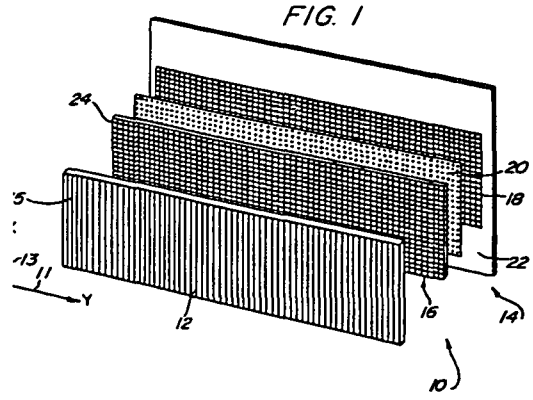
NASA



N91-32926*# National Aeronautics and Space Administration. Pasadena Office, CA.
INTEGRATED FILTER AND DETECTOR ARRAY FOR SPECTRAL IMAGING Patent Application
CLAYTON C. LABAW, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 Aug. 1991 23 p
(Contract NAS7-918)
(NASA-CASE-NPO-18317-1-CU; NAS 1.71:NPO-18317-1-CU; US-PATENT-APPL-SN-744197) Avail: NTIS HC/MF A03 CSCL 20F

A spectral imaging system having an integrated filter and photodetector array is disclosed. The filter has narrow transmission bands which vary in frequency along the photodetector array. The frequency variation of the transmission bands is matched to, and aligned with, the frequency variation of a received spectral image. The filter is deposited directly on the photodetector array by a low temperature deposition process. By depositing the filter directly on the photodetector array, permanent alignment is achieved for all temperatures, spectral crosstalk is substantially eliminated, and a high signal to noise ratio is achieved.

NASA



75
PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

N91-25875* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
PLASMA GUN WITH COAXIAL POWDER FEED AND ADJUSTABLE CATHODE Patent
ISIDOR ZAPLATYNSKY, inventor (to NASA) 5 Feb. 1991 6 p Filed 7 Jul. 1989 Supersedes N90-10718 (28 - 1, p 126)
(NASA-CASE-LEW-14901-1; US-PATENT-4,990,739; US-PATENT-APPL-SN-376488; US-PATENT-CLASS-219-121.47; US-PATENT-CLASS-219-121.52; US-PATENT-CLASS-219-121.48; US-PATENT-CLASS-219-75; US-PATENT-CLASS-219-76.16; US-PATENT-CLASS-427-34; INT-PATENT-CLASS-B23K-9/00)
Avail: US Patent and Trademark Office CSCL 20I

An improved plasma gun coaxially injects particles of ceramic materials having high melting temperatures into the central portion of a plasma jet. This results in a more uniform and higher temperature and velocity distribution of the sprayed particles. The position of the cathode is adjustable to facilitate optimization of the performance of the gun wherein grains of the ceramic material are melted at lower power input levels.

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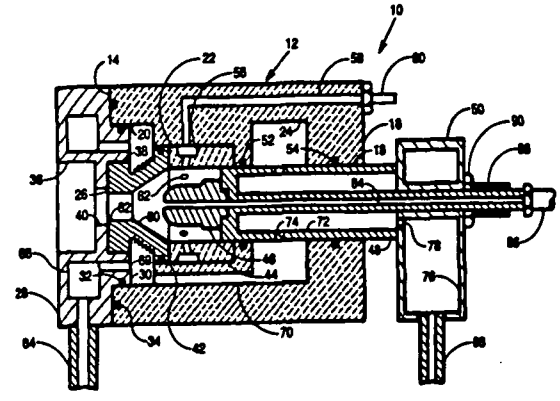
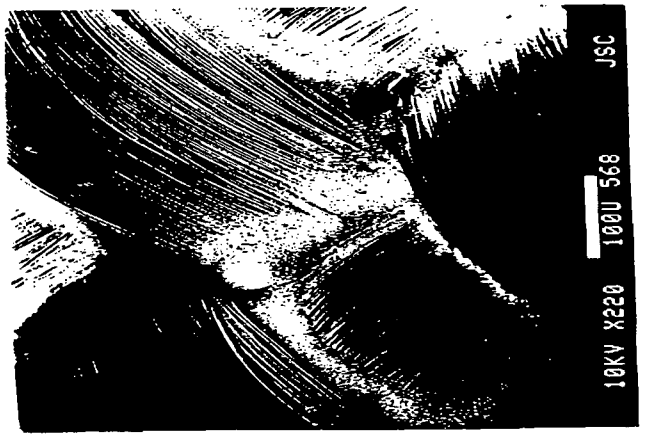


N91-32947*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METHOD FOR ANISOTROPIC ETCHING IN THE MANUFACTURE OF SEMICONDUCTOR DEVICES Patent Application
STEVEN KOONTZ, inventor (to NASA) and JON CROSS, inventor (to NASA) (Los Alamos National Lab., NM.) 12 Jul. 1991 27 p
(NASA-CASE-MSC-21631-1; NAS 1.71:MSC-21631-1; US-PATENT-APPL-SN-729107) Avail: NTIS HC/MF A03 CSCL 20I

Hydrocarbon polymer coatings used in microelectronic manufacturing processes are anisotropically etched by hyperthermal atomic oxygen beams (translational energies of 0.2 to 20 eV, preferably 1 to 10 eV). Etching with hyperthermal oxygen atom species obtains highly anisotropic etching with sharp boundaries between etched and mask protected areas.

NASA



76
SOLID-STATE PHYSICS

Includes superconductivity.

N91-21911* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
ENHANCED SINGLE LAYER MULTI-COLOR OR LUMINESCENT DISPLAY WITH COACTIVATORS Patent
JAMES B. ROBERTSON, inventor (to NASA) 22 Jan. 1991 9 p Filed 13 Apr. 1989 Continuation-in-part of US-Patent-Appl-SN-140185, filed 31 Dec. 1987
(NASA-CASE-LAR-14181-1; US-PATENT-4,987,339; US-PATENT-APPL-SN-338379; US-PATENT-APPL-SN-140185; US-PATENT-CLASS-313-502; US-PATENT-CLASS-313-503; US-PATENT-CLASS-313-506; US-PATENT-CLASS-428-690; INT-PATENT-CLASS-H05B-33/14) Avail: US Patent and Trademark Office CSCL 20L

The invention is an enhanced single layer, multi-color luminescent display comprising an insulator substrate and a single layer of host material having a smooth, flat top surface deposited thereon that hosts one or more different activators, therein forming a pattern of selected and distinctly colored phosphor areas which may be green, red, and blue respectively in the single layer of host material. Transparent electrical conductor means may be provided for subjecting selected areas of the pattern of colored phosphor areas to an electric field thereby forming a multi-color, single layer electroluminescent display. A coactivator such as a phosphor may be selectively introduced into one or more of the phosphor areas and to enhance the brilliance of the color or colors of the one or more selected phosphor areas without changing the electric field. A method of forming a multi-color luminescent display includes the steps of depositing on an insulator substrate, a single layer of host material with the properties to host varying quantities of different activators and a common activator into selected areas of said single layer of host material as by thermal diffusion or ion implantation to form a pattern of phosphor areas and of selectively enhanced colors in said single layer of host material.

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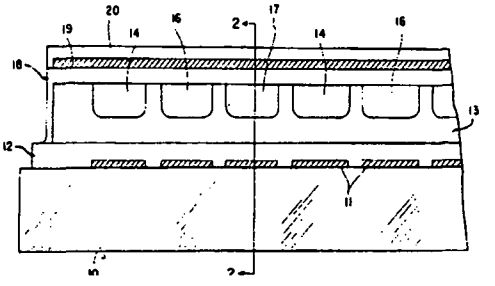
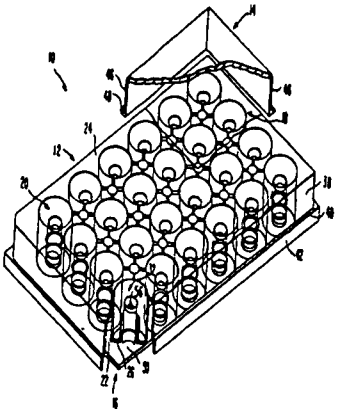


N91-23933*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
PROTEIN CRYSTAL GROWTH TRAY ASSEMBLY Patent Application
DANIEL C. CARTER, inventor (to NASA) and TERESA Y. MILLER, inventor (to NASA) 23 Oct. 1990 17 p
(NASA-CASE-MFS-28507-1; NAS 1.71:MFS-28507-1; US-PATENT-APPL-SN-601954) Avail: NTIS HC/MF A03 CSCL 20B

A protein crystal growth tray assembly includes a tray that has a plurality of individual crystal growth chambers. Each chamber has a movable pedestal which carries a protein crystal growth compartment at an upper end. The several pedestals for each tray assembly are ganged together for concurrent movement so that the solutions in the various pedestal growth compartments can be separated from the solutions in the tray's growth chambers until the experiment is to be activated.

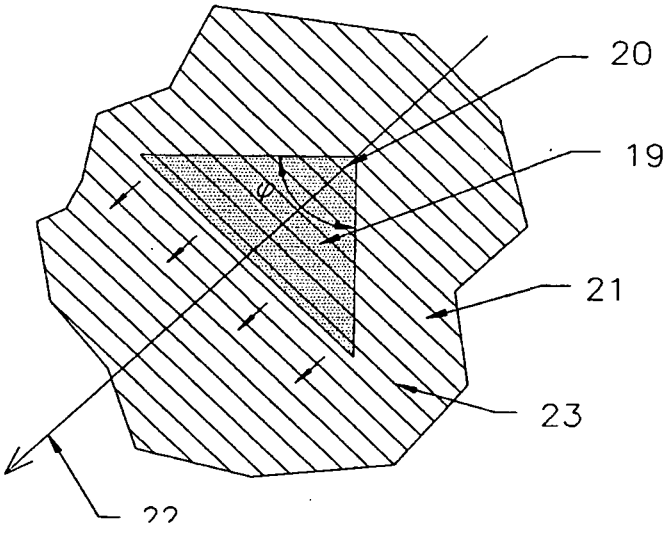
NASA



N91-26966*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
PROCESS FOR THE CONTROLLED GROWTH OF SINGLE-CRYSTAL FILMS OF SILICON CARBIDE POLYTYPES ON SILICON CARBIDE WAFERS Patent Application
J. ANTHONY POWELL, inventor (to NASA) 12 Jun. 1991 20 p
(NASA-CASE-LEW-15222-1; NAS 1.71:LEW-15222-1; US-PATENT-APPL-SN-718315) Avail: NTIS HC/MF A03 CSCL 20K

This invention is a method for the controlled growth of single-crystal semiconductor device quality films of SiC polytypes on vicinal (0001) SiC wafers with low tilt angles. Both homoepitaxial and heteroepitaxial SiC films can be produced on the same wafer. In particular, 3C-SiC and 6H-SiC films can be produced within selected areas of the same 6H-SiC wafer.

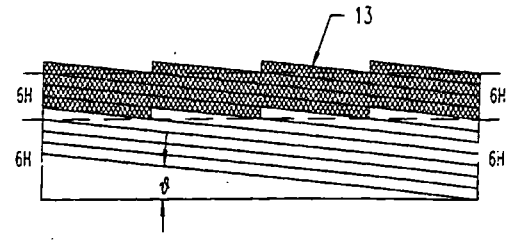
NASA



N91-26967*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
PROCESS FOR THE HOMOEPITAXIAL GROWTH OF SINGLE-CRYSTAL SILICON CARBIDE FILMS ON SILICON CARBIDE WAFERS Patent Application
J. ANTHONY POWELL, inventor (to NASA) 12 Jun. 1991 15 p
(NASA-CASE-LEW-15223-1; NAS 1.71:LEW-15223-1; US-PATENT-APPL-SN-718314) Avail: NTIS HC/MF A03 CSCL 20L

The invention is a method for growing homoepitaxial films of SiC on low tilt angle vicinal (0001) SiC wafers. The invention proposes and teaches a new theoretical model for the homoepitaxial growth of SiC films on (0001) SiC substrates. The inventive method consists of (1) preparing the growth surface of SiC wafers slightly off-axis (from less the 0.1 to 6 deg) from the (0001) plane, (2) subjecting the growth surface to a suitable etch, and then (3) growing the homoepitaxial film using conventional SiC growth techniques.

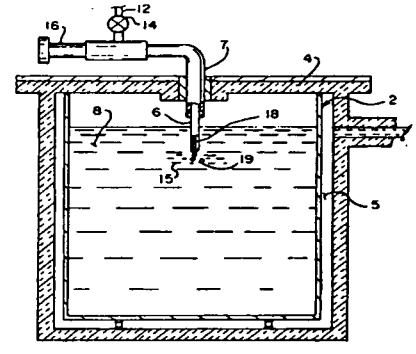
NASA



N91-26968*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
CRYSTAL GROWTH IN A MICROGRAVITY ENVIRONMENT Patent Application
ROGER L. KROES, inventor (to NASA), DONALD A. REISS, inventor (to NASA), and SANDOR L. LEHOCZKY, inventor (to NASA) 19 Jun. 1991 15 p
(NASA-CASE-MFS-28473-1; NAS 1.71:MFS-28473-1; US-PATENT-APPL-SN-717447) Avail: NTIS HC/MF A03 CSCL 20B

Gravitational phenomena, including convection, sedimentation, and interactions of materials with their containers all affect the crystal growth process. If they are not taken into consideration they can have adverse effects on the quantity and quality of crystals produced. As a practical matter, convection, and sedimentation can be completely eliminated only under conditions of low gravity attained during orbital flight. There is, then, an advantage to effecting crystallization in space. In the absence of convection in a microgravity environment cooling proceeds by thermal diffusion from the walls to the center of the solution chamber. This renders control of nucleation difficult. Accordingly, there is a need for a new improved nucleation process in space. Crystals are nucleated by creating a small localized region of high relative supersaturation in a host solution at a lower degree of supersaturation.

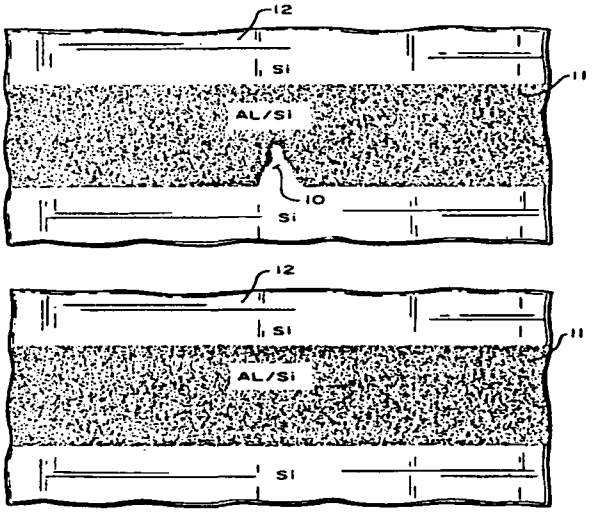
NASA



N91-28014* National Aeronautics and Space Administration. Pasadena Office, CA.
THERMAL TREATMENT OF SILICON INTEGRATED CIRCUIT CHIPS TO PREVENT AND HEAL VOIDS IN ALUMINUM METALLIZATION Patent
EDWARD F. CUDDIHY, inventor (to NASA), RUSSELL A. LAWTON, inventor (to NASA), and THOMAS R. GAVIN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 May 1991 8 p Filed 26 May 1989 Sponsored by NASA
(NASA-CASE-NPO-17678-1-CU; US-PATENT-5,019,533; US-PATENT-APPL-SN-357758; US-PATENT-CLASS-437-199; US-PATENT-CLASS-437-187; US-PATENT-CLASS-437-197; US-PATENT-CLASS-437-247; US-PATENT-CLASS-437-248; US-PATENT-CLASS-357-82; INT-PATENT-CLASS-H01L-21/324) Avail: US Patent and Trademark Office CSCL 20L

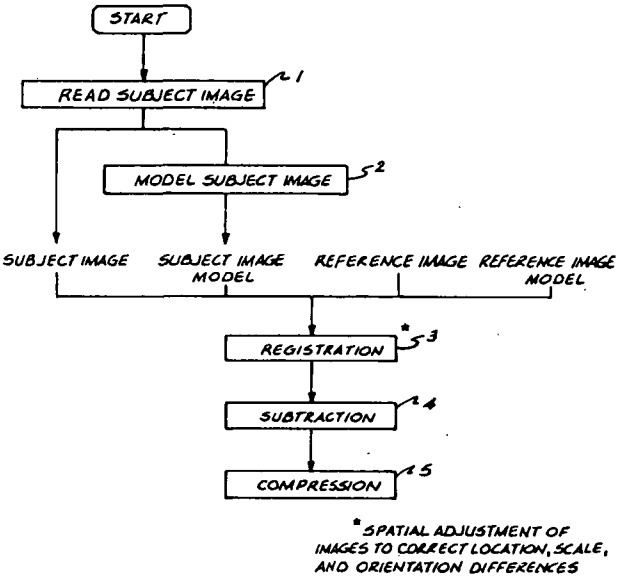
Voids in aluminum metallization conductors on a chip are avoided or healed after the chip is subjected to thermal treatment at a high temperature sufficient to allow diffusion of silicon by rapidly cooling the chip, preferably by immersion of the chip in liquid nitrogen.

Official Gazette of the U.S. Patent and Trademark Office



A process is disclosed for x ray registration and differencing which results in more efficient compression. Differencing of registered modeled subject image with a modeled reference image forms a differenced image for compression with conventional compression algorithms. Obtention of a modeled reference image includes modeling a relatively unrelated standard reference image upon a three-dimensional model, which three-dimensional model is also used to model the subject image for obtaining the modeled subject image. The registration process of the modeled subject image and modeled reference image translationally correlates such modeled images for resulting correlation thereof in spatial and spectral dimensions. Prior to compression, a portion of the image falling outside a designated area of interest may be eliminated, for subsequent replenishment with a standard reference image. The compressed differenced image may be subsequently transmitted and/or stored, for subsequent decompression and addition to a standard reference image so as to form a reconstituted or approximated subject image at either a remote location and/or at a later moment in time. Overall effective compression ratios of 100:1 are possible for thoracic x ray digital images.

NASA



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DOCUMENTATION AND INFORMATION SCIENCE

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography.

N91-23976*# National Aeronautics and Space Administration. John C. Stennis Space Center, Bay Saint Louis, MS.
DIGITAL DATA REGISTRATION AND DIFFERENCING COMPRESSION SYSTEM Patent Application
GARY A. RANSFORD, inventor (to NASA) and VIVIEN J. CAMBRIDGE, inventor (to NASA) (Sverdrup Technology, Inc., Bay Saint Louis, MS.) 1 Oct. 1990 38 p
(NASA-CASE-SSC-00010-1; NAS 1.71:SSC-00010-1; US-PATENT-APPL-SN-591643) Avail: NTIS HC/MF A03 CSCL 05B

PUBLIC AVAILABILITY OF COPIES OF PATENTS AND PATENT APPLICATIONS

Copies of U.S. patents may be purchased directly from the U.S. Patent and Trademark Office, Washington, D.C. 20231 at $1.50 per copy. When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office.

NASA *patent application specifications* are sold in paper copy and microfiche by the National Technical Information Service. The US-Patent-Appl-SN-number should be used in ordering either paper copy or microfiche from NTIS.

LICENSES FOR COMMERCIAL USE: INQUIRIES AND APPLICATIONS FOR LICENSE

NASA inventions, abstracted in *NASA PAB,* are available for nonexclusive or exclusive licensing in accordance with the NASA Patent Licensing Regulations. It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the NASA Patent Licensing Regulations.

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA-owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in *NASA PAB.*

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

STANDING ORDER SUBSCRIPTIONS

NASA SP-7039, Section 1 and its supplements are available from the National Technical Information Service (NTIS) on standing order subscription as PB 92-911100 at the price of $15.00 domestic and $30.00 foreign. Standing order subscriptions do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber.

NASA Case Number Prefix Letters	Address of Cognizant NASA Patent Counsel
ARC-xxxxx XAR-xxxxx	Ames Research Center Mail Code: 200-11A Moffett Field, California 94035 Telephone: (415) 694-5104
ERC-xxxxx XER-xxxxx HQN-xxxxx XHQ-xxxxx	NASA Headquarters Mail Code: GP Washington, D.C. 20546 Telephone: (202) 453-2417
GSC-xxxxx XGS-xxxxx	Goddard Space Flight Center Mail Code: 204 Greenbelt, Maryland 20771 Telephone: (301) 286-7351
KSC-xxxxx XKS-xxxxx	John F. Kennedy Space Center Mail Code: PT-PAT Kennedy Space Center, Florida 32899 Telephone: (305) 867-2544
LAR-xxxxx XLA-xxxxx	Langley Research Center Mail Code: 279 Hampton, Virginia 23365 Telephone: (804) 865-3725
LEW-xxxxx XLE-xxxxx	Lewis Research Center Mail Code: 500-318 21000 Brookpark Road Cleveland, Ohio 44135 Telephone: (216) 433-5753
MSC-xxxxx XMS-xxxxx	Lyndon B. Johnson Space Center Mail Code: AL3 Houston, Texas 77058 Telephone: (713) 483-4871
MFS-xxxxx XMF-xxxxx	George C. Marshall Space Flight Center Mail Code: CC01 Huntsville, Alabama 35812 Telephone: (205) 544-0024
NPO-xxxxx XNP-xxxxx FRC-xxxxx XFR-xxxxx WOO-xxxxx	NASA Resident Legal Office Mail Code: 180-801 4800 Oak Grove Drive Pasadena, California 91103 Telephone: (818) 354-2700

PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

14 CFR Part 1245

Licensing of NASA Inventions

AGENCY: National Aeronautics and Space Administration
ACTION: Interim regulation with comments requested.

SUMMARY: The National Aeronautics and Space Administration (NASA) is revising its patent licensing regulations to conform with Pub. L. 96-517. This interim regulation provides policies and procedures applicable to the licensing of federally owned inventions in the custody of the National Aeronautics and Space Administration, and implements Pub. L. 96-517. The object of this subpart is to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

EFFECTIVE DATE: July 1, 1981. Comments must be received in writing by December 2, 1981. Unless a notice is published in the **Federal Register** after the comment period indicating changes to be made, this interim regulation shall become a final regulation.

ADDRESS: Mr. John G. Mannix, Director of Patent Licensing, GP-4, NASA, Washington, D.C. 20546

FOR FURTHER INFORMATION CONTACT:
Mr. John G. Mannix, (202) 755-3954.

SUPPLEMENTARY INFORMATION:

PART 1245—PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

Subpart 2 of Part 1245 is revised to read as follows:

* * * * *

Subpart 2—Licensing of NASA Inventions

Sec.

Restrictions and Conditions

Types of Licenses

Procedures

Authority: 35 U.S.C. Section 207 and 208.94 Stat 3023 and 3024.

* * * * *

Subpart 2—Licensing of NASA Inventions

§ 1245.200 Scope of subpart.

This subpart prescribes the terms, conditions and procedures upon which a NASA invention may be licensed. It does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

§ 1245.201 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

§ 1245.202 Definitions

(a) "Federally owned invention" means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) "Federal agency" means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a Federally owned invention.

(c) "NASA Invention" means a Federally owned invention with respect to which NASA maintains custody and administration, in whole or in part, of the right, title or interest in such invention on behalf of the United States Government.

(d) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of these regulations, the size standard for small business concerns involved in Government procurement, contained in 13 CFR 121.3-8, and in subcontracting, contained in 13 CFR 121.3-12, will be used.

(e) "Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such condition, as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(f) "United States" means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

§ 1245.203 Authority to grant licenses.

NASA inventions shall be made available for licensing as deemed appropriate in the public interest. NASA may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this subpart on inventions in its custody.

Restrictions and Conditions

§ 1245.204 All licenses granted under this subpart.

(a) *Restrictions.* (1) A license may be granted only if the applicant has supplied NASA with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a NASA invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) *Conditions.* Licenses shall contain such terms and conditions as NASA determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this subpart. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement, unless sooner terminated in accordance with this subpart.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The license may provide the licensee the right to grant sublicenses under the license, subject to the approval of NASA. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to NASA.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) All licenses shall normally require royalties or other consideration.

(8) Where an agreement is obtained pursuant to § 1245.204(a)(2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of NASA to terminate the license, in whole or in part, if:

(i) NASA determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of NASA that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) NASA determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this subpart, upon mutual agreement of NASA and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this subpart shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Types of Licenses

§ 1245.205 Nonexclusive licenses.

(a) *Availability of licenses.* Nonexclusive licenses may be granted under NASA inventions without publication of availability or notice of a prospective license.

(b) *Conditions.* In addition to the provisions of § 1245.204, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, NASA may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

§ 1245.206 Exclusive and partially exclusive licenses.

(a) Domestic licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on NASA inventions: (i) 3 months after notice of the invention's availability has been announced in the **Federal Register;** or (ii) without such notice where NASA determines that expeditious granting of such a license will best serve the interests of the Federal Government and the public; and (iii) in either situation, specified in (a)(1)(i) or (ii) of this section only if:

(A) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period;

(B) After expiration of the period in § 1245.206(a)(1)(iii)(A) and consideration of nay written objections received during the period, NASA has determined that:

(*1*) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilizaiton by the public;

(*2*) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(*3*) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(*4*) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(C) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(D) NASA has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to domestic exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to NASA the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) Foreign licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on a NASA invention covered by a foreign patent, patent application, or other form of protection, provided that:

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) NASA has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) *Record of determinations.* NASA shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Procedures

§ 1245.207 Application for a license.

An application for a license should be addressed to the Patent Counsel at the NASA installation having responsibility for the invention and shall normally include:

(a) Identification of the invention for which the license is desired, including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of representative of applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether applicant is a small business firm as defined in § 1245.202(c);

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under Federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

§ 1245.208 Processing applications.

(a) Applications for licenses will be initially reviewed by the Patent Counsel of the NASA installation having responsibility for the invention. The Patent Counsel shall make a preliminary recommendation to the Director of Licensing, NASA Headquarters, whether to: (1) grant the license as requested, (2) grant the license with modification after negotiation with the licensee, or (3) deny the license. The Director of Licensing shall review the preliminary recommendation of the Patent Counsel and make a final recommendation to the NASA Assistant General Counsel for Patent Matters. Such review and final recommendation may include, and be based on, any additional information obtained from applicant and other sources that the Patent Counsel and the Director of Licensing deem relevant to the license requested. The determination to grant or deny the license shall be made by the Assistant General Counsel for Patent Matters based on the final recommendation of the Director of Licensing.

(b) When notice of a prospective exclusive or partially exclusive license is published in the **Federal Register** in accordance with § 1245.206(a)(1)(iii)(A) or § 1245.206(b)(1)(i), any written objections received in response thereto will be considered by the Director of Licensing in making the final recommendation to the Assistant General Counsel for Patent Matters.

(c) If the requested license, including any negotiated modifications, is denied by the Assistant General Counsel for Patent Matters, the applicant may request reconsideration by filing a written request for reconsideration within 30 days after receiving notice of denial. This 30-day period may be extended for good cause.

(d) In addition to, or in lieu of requesting reconsideration, the applicant may also appeal the denial of the license in accordance with § 1245.211.

§ 1245.209 *Notice to Attorney General.*

A copy of the notice provided for in §§ 1245.206(a)(1)(iii)(A), and 1245.206(b)(1)(i) will be sent to the Attorney General.

§ 1245.210 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, NASA shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license should not be modified or terminated.

§ 1245.211 Appeals.

(a) The following parties may appeal to the NASA Administrator or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(1) A person whose application for a license has been denied;

(2) A licensee whose license has been modified or terminated, in whole or in part; or

(3) A person who timely filed a written objection in response to the notice required by §§ 1245.206(a)(1)(iii)(A) or 1245.206(b)(1)(i) and who can demonstrate to the satisfaction of NASA that such person may be damaged by the Agency action.

(b) Written notice of appeal must be filed within 30 days (or such other time as may be authorized for good cause shown) after receiving notice of the adverse decision or determination; including, an adverse decision following the request for reconsideration under § 1245.208(c). The notice of appeal, along with all supporting documentation should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, DC 20546. Should the appeal raise a genuine dispute over material facts, fact-finding will be conducted by the NASA Inventions and Contributions Board. The person filing the appeal shall be afforded an opportunity to be heard and to offer evidence in support of the appeal. The Chairperson of the Inventions and Contributions Board shall prepare written findings of fact and transmit them to the Administrator or designee. The decision on the appeal shall be made by the NASA Administrator or designee. There is no further right of administrative appeal from the decision of the Administrator or designee.

§ 1245.212 Protection and administration of inventions.

NASA may take any suitable and necessary steps to protect and administer rights to NASA inventions, either directly or through contract.

§ 1245.213 Transfer of custody.

NASA having custody of certain Federally owned inventions may transfer custody and administration in whole or in part, to another Federal agency, of the right, title, or interest in any such invention.

§ 1245.214 Confidentiality of information.

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Administrator.

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